AXIOMTEK

MPC175-873 Series

17” TFT Fanless Medical Grade Panel Computer with Intel® Core™ i7/i5/i3 Processor

User’s Manual

RoHS

Disclaimers

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Safety Approvals

- CE Marking
- EN60601-1, UL60601-1
- FCC Class B

FCC Compliance

This equipment has been tested in compliance with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are meant to provide reasonable protection against harmful interference in a residential installation. If not installed and used in accordance with proper instructions, this equipment might generate or radiate radio frequency energy and cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following methods:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment to another outlet of a circuit that doesn't connect with the receiver.
4. Consult the dealer or an experienced radio/TV technician for help.

Shielded interface cables must be used in order to comply with the emission limits.

Safety Precautions

Before getting started, read the following important safety precautions.

1. The **MPC175-873 Series** does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the **MPC175-873 Series** before any installation. Be sure both the system and external devices are turned OFF. A sudden surge of power could ruin sensitive components that the **MPC175-873 Series** must be properly grounded.
4. Make sure it is the correct voltage of the power source before connecting the equipment to the power outlet.
5. The brightness of the flat panel display will be getting weaker as a result of frequent usage. However, the operating period varies depending on the application environment.
6. Turn OFF the system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen. The **MPC175-873 Series** may come with or w/o a touchscreen. Although the touchscreen is chemical resistant, it is recommended that you spray the liquid cleaner on a cloth first before wiping the screen. In case your system comes without the touchscreen, you must follow the same procedure and not spray any cleaner on the flat panel directly.
7. Avoid using sharp objects to operate the touchscreen. Scratches on the touchscreen may cause malfunction or internal failure to the touchscreen.
8. The flat panel display is not susceptible to shock or vibration. When assembling the **MPC175-873 Series**, make sure it is securely installed.
9. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -20℃ or above 60℃. It may damage the equipment.
10. External equipment intended for connection to signal input/out or other connectors shall comply with relevant UL/IEC standard.
11. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
    - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
    - When handling boards and components, wear a wrist-grounding strap, available from most electronic component stores.

Classification

1. Degree of production against electric shock: not classified
2. Degree of protection against the ingress of water: IPX1
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
4. Mode of operation: Continuous
5. Type of protection against electric shock: Class I equipment

IMPORTANT SAFETY INSTRUCTIONS

READ BEFORE OPERATING EQUIPMENT

This product was designed and manufactured to meet strict quality and safety standards. There are, however, some installation and operation precautions which you should be particularly aware of.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Classification Class I ME Equipment.
6. External Power Adapter, Input : 100 – 240 Vac, 50 – 60 Hz
7. The medical panel computer is certified with medical certifications to meet medical grade approval standards. The fan-less design and against enclosure allow it to operate reliably and quietly, it applied in any medical environments.
8. WARNING: To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth
9. Accessory equipment connected to the analog and digital interfaces must be in compliance with the respective nationally harmonized IEC standards (i.e. IEC 60601-1 for medical equipment, IEC 60950-1 for ITE equipment) Furthermore all configurations shall comply with the system standard in IEC 60601-1. Anyone who connects additional equipment to the signal input part or signal output part is configuring a medical system, and is therefore, responsible that the system complies with the requirements of the system standard IEC 60601-1
10. Power supply is specified as a part of ME EQUIPMENT.
11. For pluggable equipment, the mains connector shall be installed near the equipment and shall be easily accessible.
12. Follow the national requirement to dispose unit/accessories/waste products/residues etc.
13. Warning : Do not modify this equipment without authorization of the manufacturer.
14. Warning: the operator not to touch the connectors and the patient at the same time.

General Cleaning Tips

You may need the following precautions before you begin to clean the computer. When you clean any single part or component for the computer, please read and understand the details below fully.

1. When you need to clean the device, please rub it with a piece of dry cloth.
2. Be cautious of the tiny removable components when you use a vacuum cleaner to absorb the dirt on the floor.
3. Turn the system off before you start to clean up the component or computer.
4. Never drop the components inside the computer or get circuit board damp or wet.
5. Be cautious of all kinds of cleaning solvents or chemicals when you use it for the sake of cleaning. Some individuals may be allergic to the ingredients.
6. Try not to put any food, drink or cigarette around the computer.

Cleaning Tools:

Although many companies have created products to help improve the process of cleaning your computer and peripherals users can also use household items to clean their computers and peripherals. Below is a listing of items you may need or want to use while cleaning your computer or computer peripherals.

Keep in mind that some components in your computer may only be able to be cleaned using a product designed for cleaning that component, if this is the case it will be mentioned in the cleaning.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, we still recommend you to rub it with a piece of cloth.
- Water or rubbing alcohol: You may moisten a piece of cloth a bit with some water or rubbing alcohol and rub it on the computer. Unknown solvents may be harmful to the plastics parts.
- Vacuum cleaner: Absorb the dust, dirt, hair, cigarette particles, and other particles out of a computer can be one of the best methods of cleaning a computer. Over time these items can restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas in your keyboard, mouse, and other locations.
- Foam swabs: Whenever possible it is better to use lint free swabs such as foam swabs.

Note *We strongly recommended that you should shut down the system before you start to clean any single components.*

Please follow the steps below:

1. Close all application programs
2. Close operating software
3. Turn off power switch
4. Remove all device
5. Pull out power cable

Scrap Computer Recycling

If the computer equipments need the maintenance or are beyond repair, we strongly recommended that you should inform your Axiomtek distributor as soon as possible for the suitable solution. For the computers that are no longer useful or no longer work well, please contact your Axiomtek distributor for recycling and we will make the proper arrangement.

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CHAPTER 1
INTRODUCTION

This chapter contains general information and detailed specifications of the **MPC175-873 Series**. Chapter 1 includes the following sections:

- **General Description**
- **Features**
- **System Specification**
- **Dimensions**
- **I/O Outlets**
- **Package List**

1.1 General Description

The MPC175-873 is an ultra slim panel computer equipped with 17-inch 350nits brightness SXGA LCD display and supports superior 2nd and 3rd Generation Intel® Core™ i7/i5/i3/Pentium/Celeron processor up to 35W and up to 16GB of dual-channel DDR3 system memory. Powered by Intel® the mobile Intel QM77 express chipset, it offers excellent 3D graphics and dual-view capability. The medical panel computer is certified with medical certifications to meet medical grade approval standards. The fanless design and waterproof enclosure allow it to operate reliably and quietly, it applied in any medical environments.

The panel also supports Dual View and multiple I/O options. Furthermore, the MPC175-873 supports a PCI or PCIe interface for flexibility and an internal antenna for wireless expansion. With a built-in 5 mega pixels camera and speakers, this durable panel computer is also the best solutions for VoIP and remote monitoring. This safe, reliable and user-friendly medical panel computer can ensure customer's project success and best suited for eHealthcare, Point of Care, and telemedicine.

1.2 Features

- 17" (350nits) SXGA TFT LCD, resolution 1280 x 1024
- Fanless 2nd & 3rd Generation Intel® Core™ i7/i5/i3/Pentium/ Celeron® processor
- UL60601-1/ EN60601-1, CE & FCC class B certified
- Spill and dust resistant design (front panel: IP65, whole enclosure: IPX1)
- Optional 1 PCI or PCIe x 4 expansion slot
- Isolated COM, USB, Ethernet ports
- Front 5 mega pixels camera
- Optional Wi-Fi/ Bluetooth / HSDPA / LTE communication module

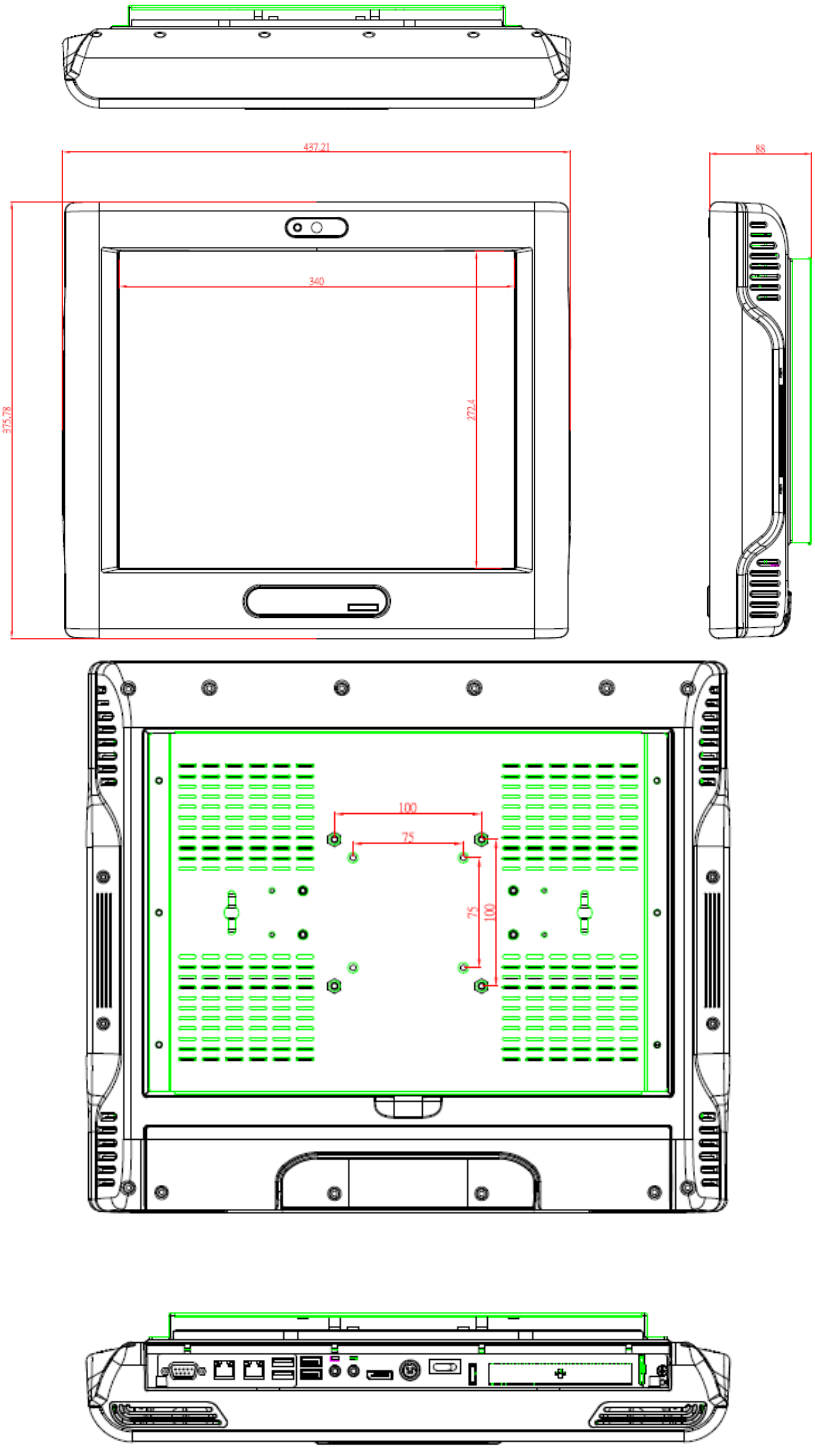
1.3 System Specifications

Front Bezel	Plastic ABS	
LCD Panel	Display Type	17" SXGA TFT
	Brightness (Cd/M²)	350 nits
	Resolution	1280 x 1024
	Viewing Angle (H/V)	80º(Right) 80º(Left) / 60º(UP) 80º(Down)
Main System	CPU	Fanless socket rPGA988B 2nd & 3rd Generation Intel® Core™ i7/i5/i3/Pentium/Celeron® processor, TDP is up to **35W**
	Chipset	Intel® QM77 PCH
	System Memory	Supports 2 DDR3 SODIMM memory up to 16 GB
	Storage	1 x 2.5" SATA HDD 1 x mSATA SSD
	Optical Drive	1 x Super Multi DVD (optional)
I/O Connectors	1 x RS-232/422/485 (COM 1, isolated 4KV)	
	2 x USB2.0 (isolated 4KV)	
	2 x USB3.0	
	1 x Audio (Mic-in), 1 x Audio (Line-out)	
	1 x Dual-mode DisplayPort	
	2 x 10/100/1000 Mbps Ethernet (isolated 4KV)	
	1 x 24V DC-IN Power Connector	
Expansion Interface	1 x PCI or PCIe slot (optional)	
	1 x full-size PCIe Mini Card slot (support mSATA)	
	1 x half-size PCIe Mini Card slot with SIM socket	
Speakers	2 x 2W internal speakers	
Camera	1 X 5 Mega Pixels Camera	
Touchscreen	Five Wired Resistive Type	
	Light Transmission: 80%	
	Touch Lifetime: 35 Million Touches	
OSD Function Key	LCD brightness up/down, audio volume up/down, and touch on/off	
Power Supply	100~240V AC-DC Medical Adapter	
Dimensions	437.21mm (17.21") (W) x 88mm (3.46") (D) x 375.78mm (14.79") (H)	
Weight	8.098 kg (17.85 lb)	
Environmental	Operation Temperature: 0ºC~40ºC (32ºF~104ºF)	
	Storage Temperature: -20ºC~60ºC (-4ºF~140ºF)	
	Relative Humidity: 10%~95%, Non-Condesing	
Certification	CE, FCC classB, EN6060101, UL60601-1	

Note **1.All specifications and images are subject to change without notice.**
If choosing 45W Core i7 processor, the operation temperature of MPC175-873 is 0ºC~35ºC.
2. Two Isolated USB ports share 0.5A together.

1.4 Dimensions

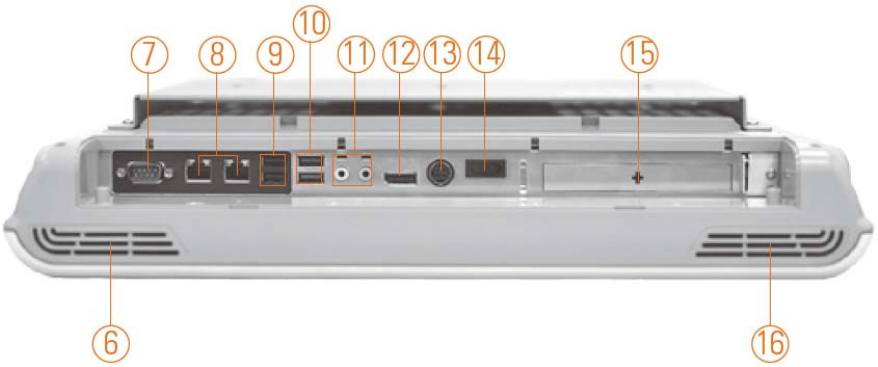
The following diagrams show you dimensions and outlines of the **MPC175-873 Series**.



1.5 I/O Outlets

The following figures show you the locations of the **MPC175-873 Series** I/O outlets.

NO	CONNECTOR
1	Brightness Adjust Buttons
2	Volume Adjust Buttons
3	LED indicator
4	MIC
5	Touch on/off button



NO	CONNECTOR
6	Speaker (R)
7	Isolated COM 1(RS-232/422/485)
8	Isolated Giga LAN x 2
9	Isolated USB x 2
10	USB 3.0 x 2
11	Audio (Line-out/Mic-in)
12	Display Port
13	Power connector
14	Power switch
15	PCI or PCIe slot
16	Speaker (L)

1.6 Packing List

The package bundled with your **MPC175-873 Series** should contain the following items:

- MPC175-873 Series Unit x 1
- 100~240V AC-DC Medical Adapter
- Driver/Utility Disc x 1 (For Driver and User's Manual)
- Super Multi DVD Cover x 2 (For Super-multi DVD type)
- Wall-Mount Bracket x 1

If you cannot find this package or any items are missing, please contact AXIOMTEK distributors immediately.

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CHAPTER 2
HARDWARE INSTALLATION

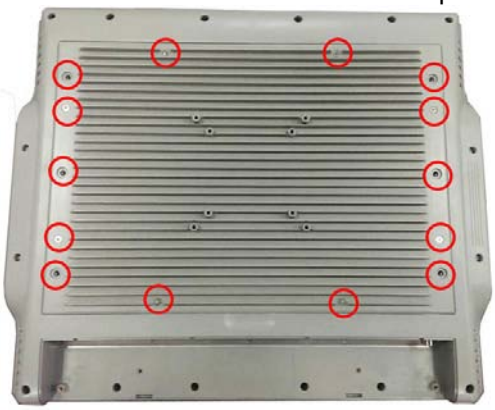
The **MPC175-873 Series** are convenient for your various hardware configurations, such as CPU (Central Processing Unit) and HDD (Hard Disk Drive). The chapter 2 will show you how to install the hardware. It includes:

2.1 CPU and DRAM Installation

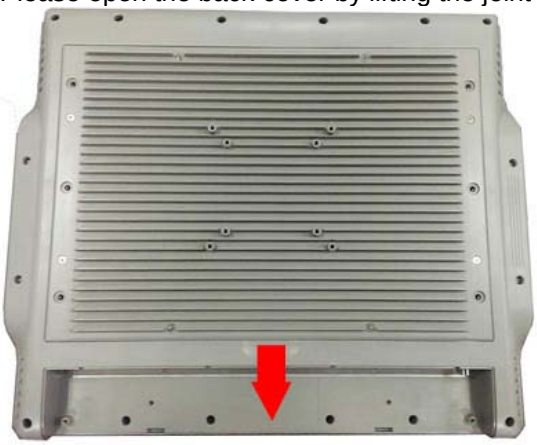
The MPC175-873 provides socket rPGA988B for processor and two 204-pin DDR3 SO-DIMM sockets that support system memory up to 16GB. Please follow steps below to install the memory modules:

Step 1 Turn off the system, and unplug the Power cord.

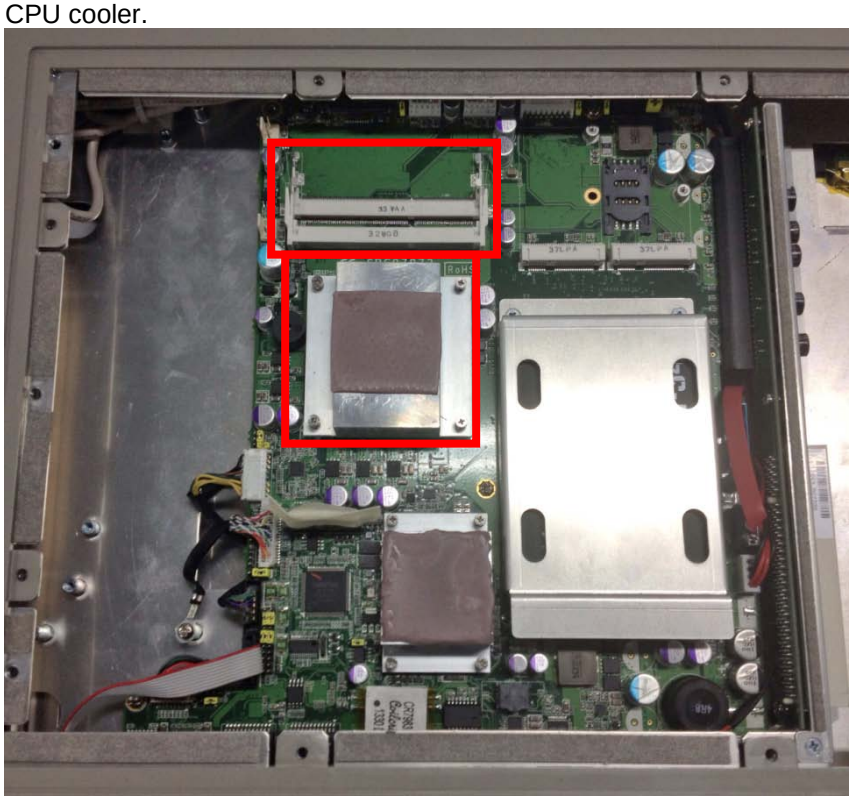
Step 2 Locate and release these screws to open the back cover.



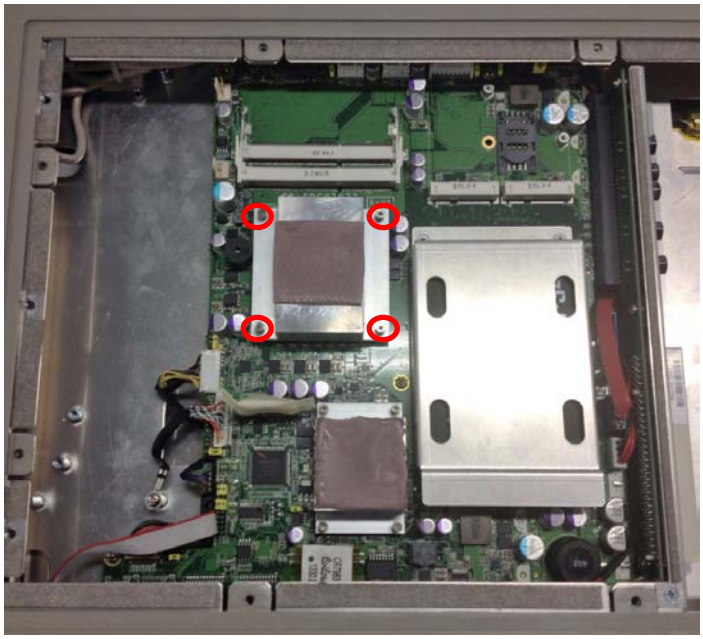
Step 3 Please open the back cover by lifting the joint part as marked.



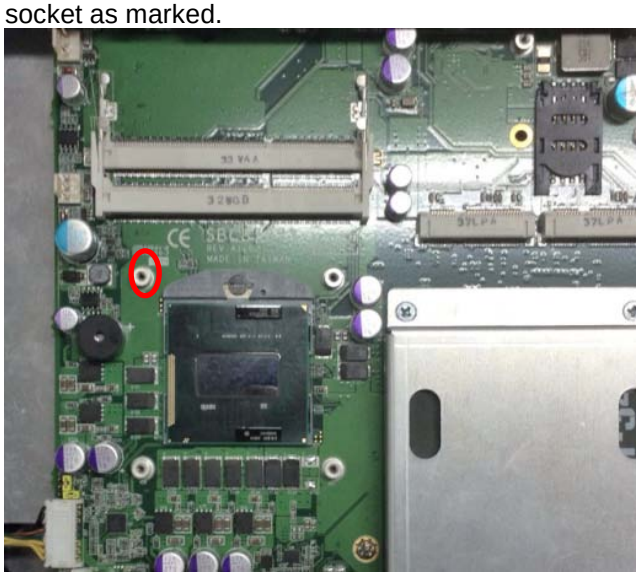
Step 4 Open the back cover and find main board and locate the SO-DIMM socket and CPU cooler.



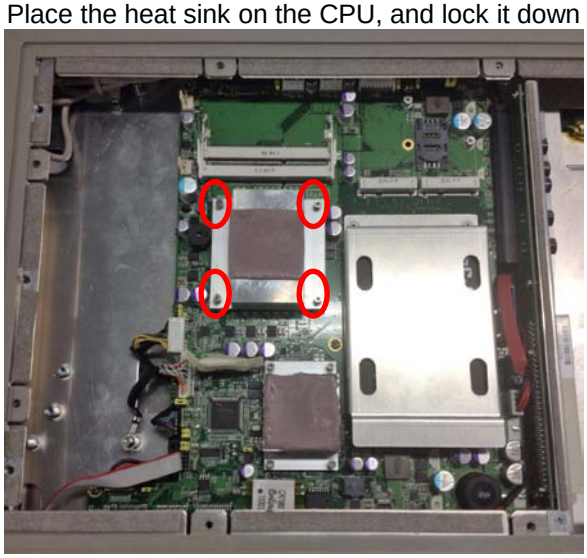
Step 5 Release these screws as marked.



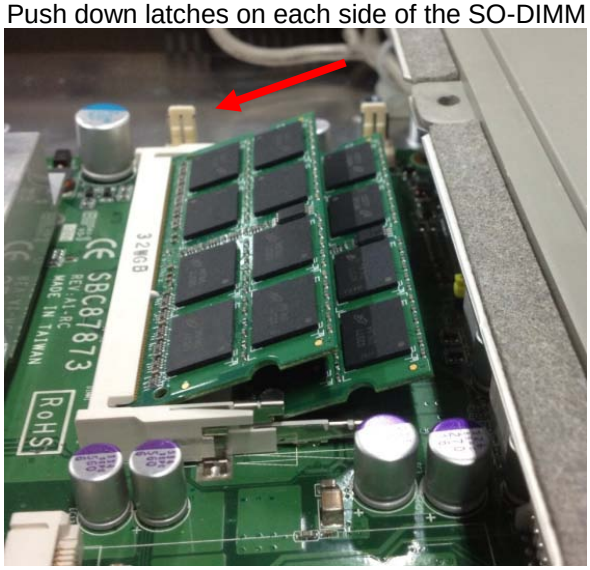
Step 6 Align pins of the CPU with pin holes of the socket. Be careful of the CPU's orientation that you need to align the arrow mark on the CPU with the arrow key on the socket. Place the CPU into the socket, and use a screwdriver to lock it onto the socket as marked.



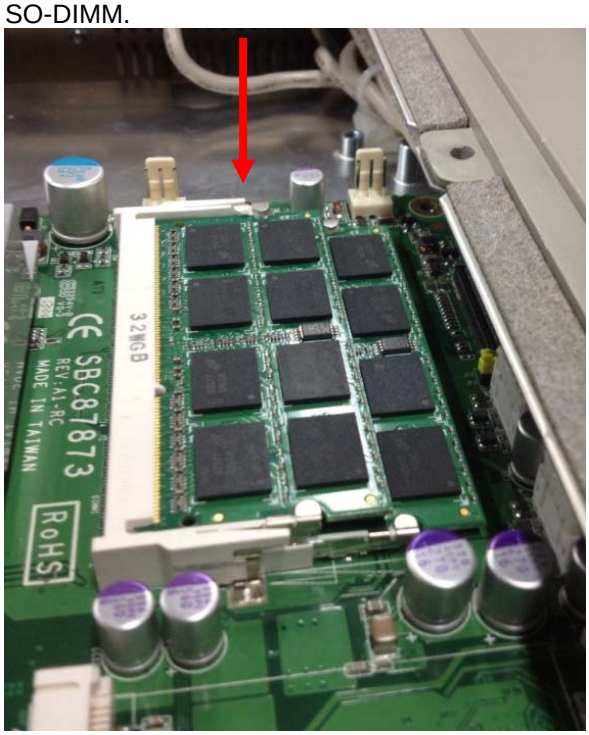
Step 7 Place the heat sink on the CPU, and lock it down as marked.



Step 8 Push down latches on each side of the SO-DIMM socket.



Step 9 Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the SO-DIMM.

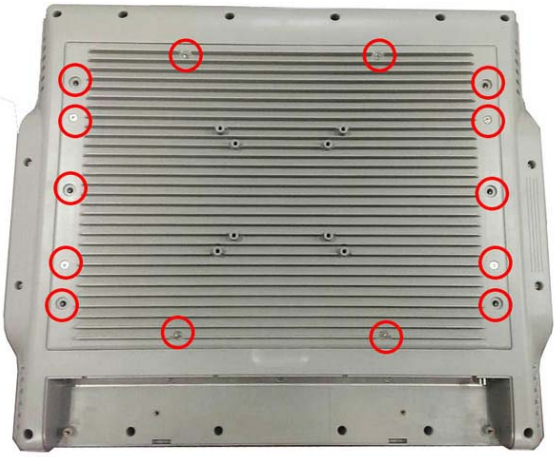


2.2 Hard Disk Drive Installation

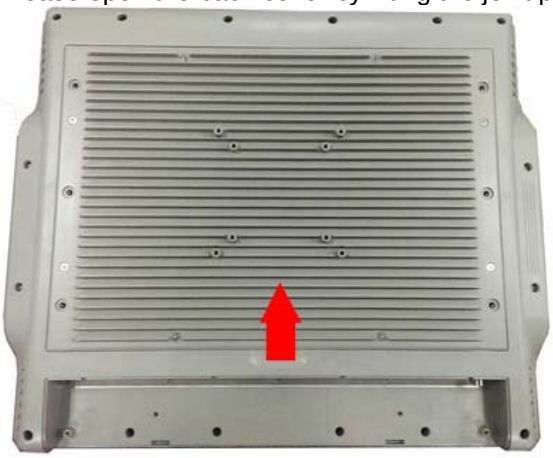
The **MPC175-873 Series** offers a convenient drive bay module for users to install HDD. The system offers users one 2.5" Hard Disk Drive for installation. Please follow the steps:

Step 1 Turn off the system, and unplug the Power cord.

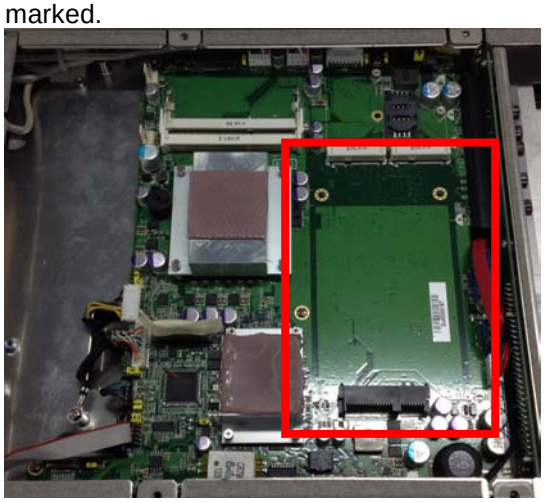
Step 2 Locate and release these screws to open the back cover.



Step 3 Please open the back cover by lifting the joint part as marked.



Step 4 Find the HDD bracket on accessory package and fine HDD socket on main board as marked.

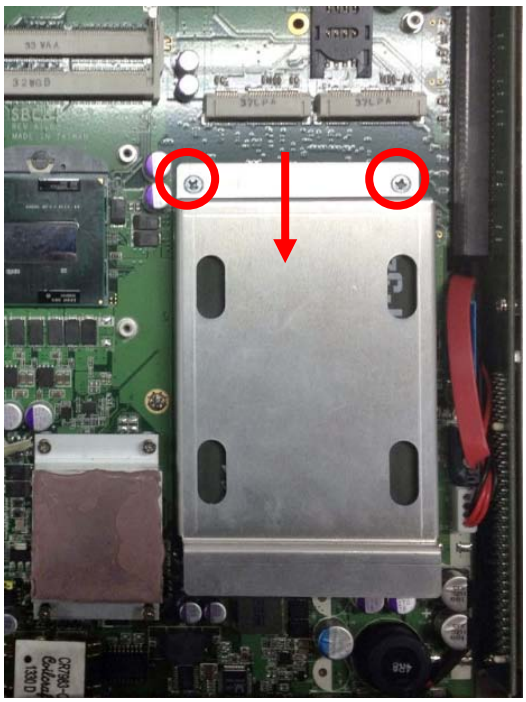


Step 5 Use assembly parts to fix HDD with the bracket.

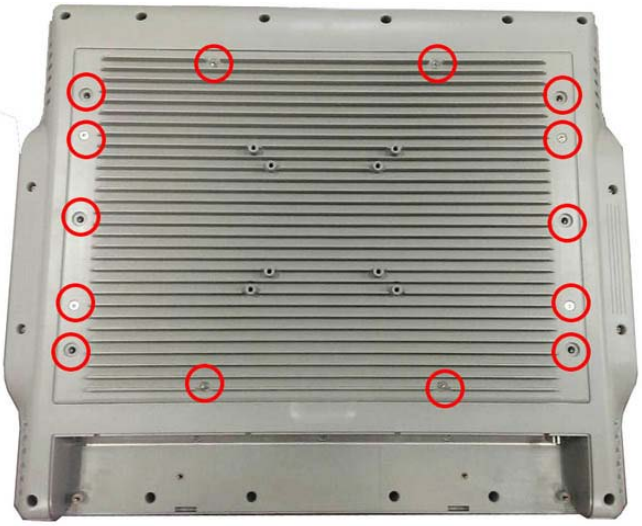
1. HDD Bracket x1
2. 2.5 inch Hard-disk
3. Screw x 4
4. Fix four screw holes on the bracket, and assembly the HDD with the bracket.

Note ***Please follow the direction of Hard-disk installation. "Hard-disk PCB faceup".***

Step 6 Install the HDD bracket inside the system. Plug the HDD in the SATA connector on main board. Fix two screw holes on main board as marked



Step 7 Close the back cover to the chassis, and fasten all screws.

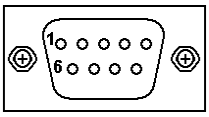


2.3 Serial Ports Interface

The **MPC175-873 series** has three serial ports, COM1 (RS-232/ 422/ 485) with isolated 4KV.

The following table shows you the pin assignments of this connector:

Pin	Signal	Pin	Signal
1	Data Carrier Detect (DCD)	6	Data Set Ready (DSR)
2	Receive Data (RXD)	7	Request To Send (RTS)
3	Transmit Data (TXD)	8	Clear To Send (CTS)
4	Data Terminal Ready (DTR)	9	Ring Indicator (RI)
5	Ground (GND)		



In addition, COM1 can be set for RS-232/422/485 via BIOS.

In BIOS, user can change transmission mode in following menu.
Advanced➔NCT6106D Super IO Configuration➔Serial Port 0 Configuration➔Transmission Mode

Please refer to Chapter 3 for BIOS setting.

When COM1 is set to RS-422 or RS-485, the pin assignments are listed below:

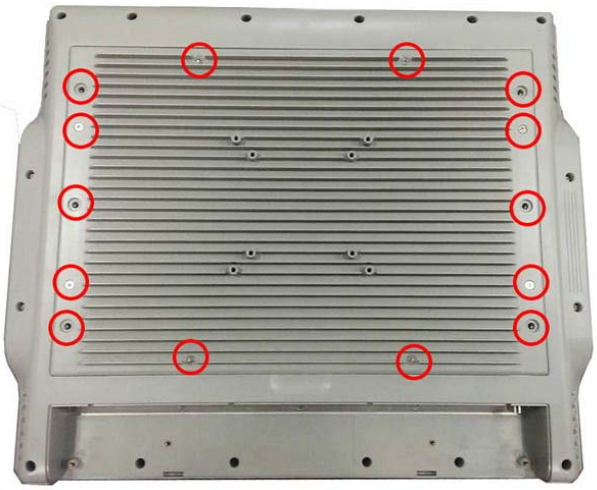
Pin	Signal Name	
	RS-422	RS-485
1	TX-	DATA-
2	TX+	DATA+
3	RX+	No connector
4	RX-	No connector
5	No connector	No connector
6	No connector	No connector
7	No connector	No connector
8	No connector	No connector
9	No connector	No connector

2.4 PCIe Mini Card Module Installation

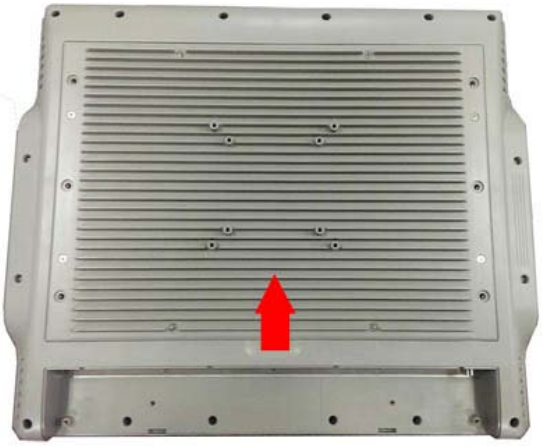
You can follow the steps below to install PCIe mini card modules.

Step 1 Turn off the system, and unplug the Power cord.

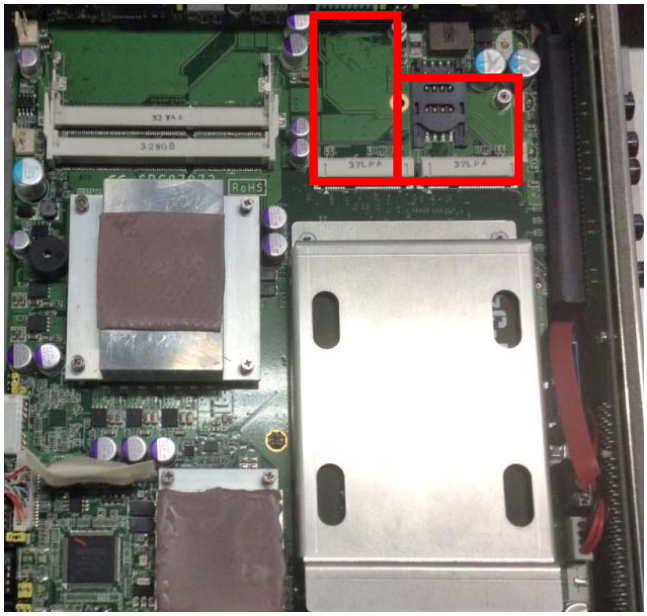
Step 2 Locate and release these screws to open the back cover.



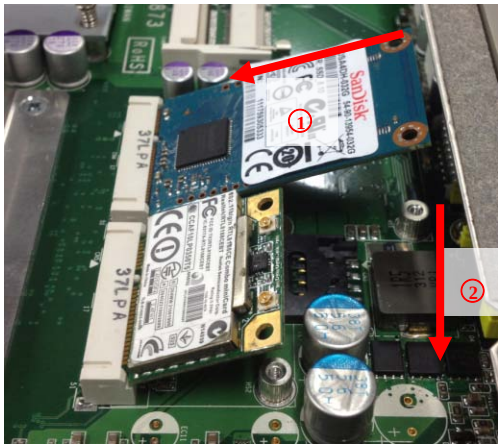
Step 3 Please open the back cover by lifting the joint part as marked.



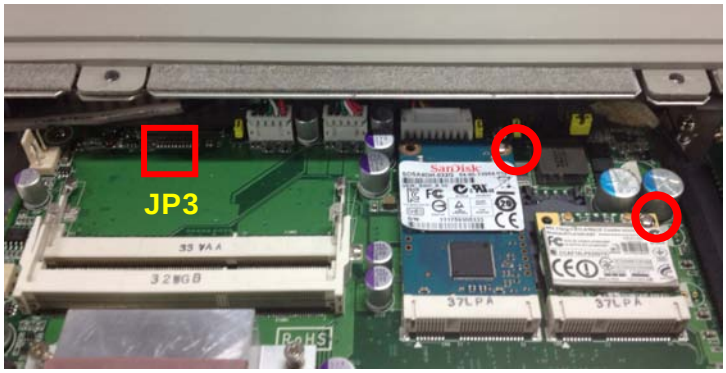
Step 4 There are two slots. One is full-size mini card slot which supports mSATA. The other is half-size mini card slot with a SIM card socket.



Step 5 The socket latches are clipped on to the edges of the mini card. Install mini card to the socket.



Step 6 Install mini card to the socket and fasten screws.

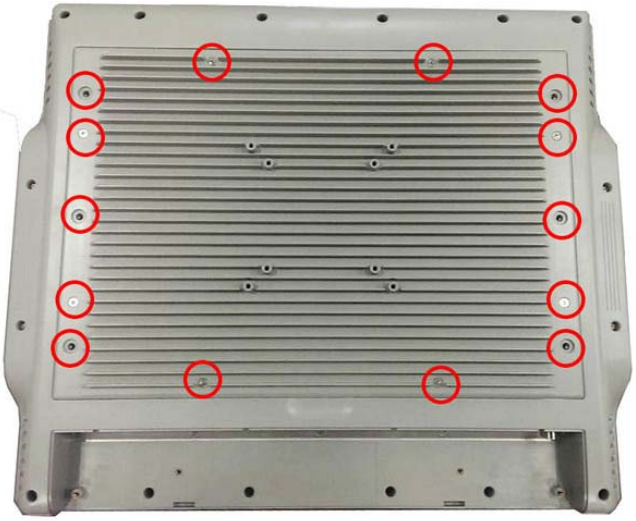


Step 7 If installing mSATA, please adjust JP3 jumper.

Jumper	Default Setting	Jumper Setting
JP3	PCIe device (default setting)	Short 1-2
	mSATA device	Short 2-3

Step 8 If installing wireless or 3G module, find the built-in antenna cable and connect it to the connector on wireless or 3G module.

Step 9 Close the back cover to the chassis, and fasten all screws.

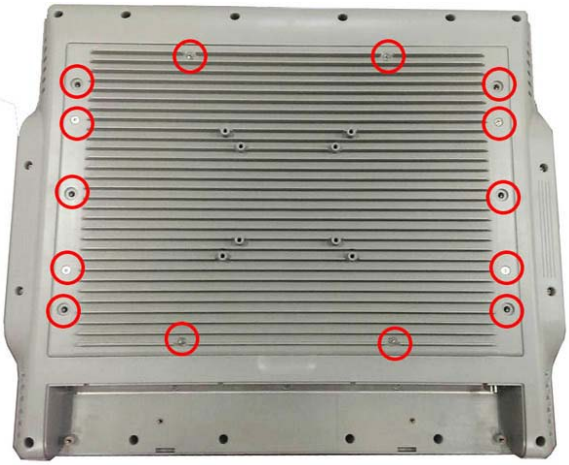


2.5 Add-on card Installation (Optional)

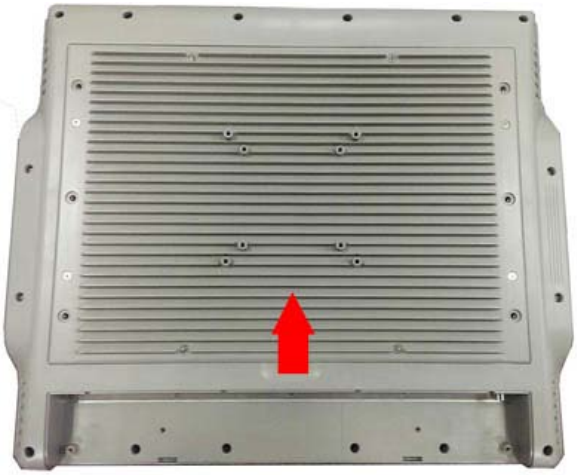
You can follow the steps below to install an optional add-on card.

Step 1 Turn off the system, and unplug the Power cord.

Step 2 Locate and release these screws to open the back cover.

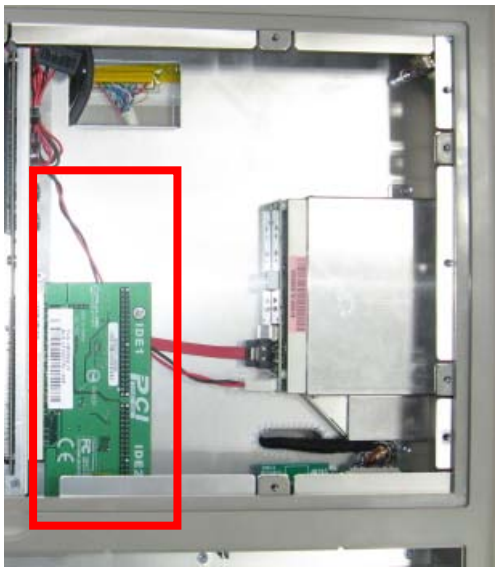


Step 3 Please open the back cover by lifting the joint part as marked.



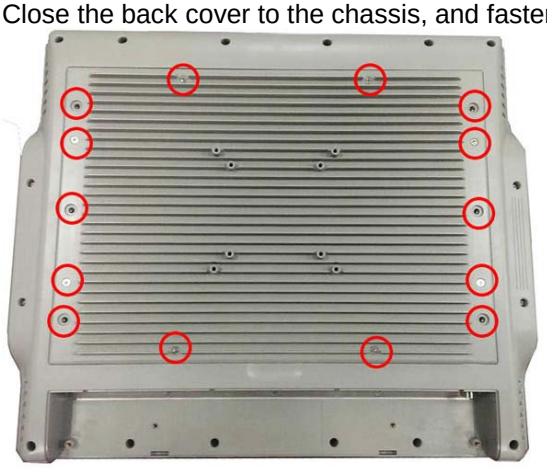
Step 4 Release the screw as marked. And remove plates.

Step 5 Insert the add-on card in the socket firmly until it is completely seated.



Step 6 Fasten the screw as marked

Step 7 Close the back cover to the chassis, and fasten all screws.



Please note that users only can install either expansion card or optical drive.

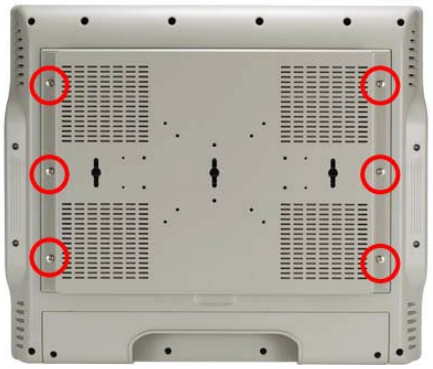
2.6 Mount

There are several mounting ways for the **MPC175-873 Series**, Wall mount, VESA and Desktop mountings as below:

2.6.1 Wall mount

The mounting for MPC175-873 Series is Wall mount as below:

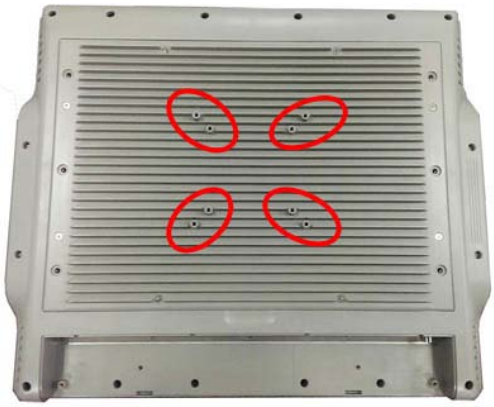
Step 1 Prepare all parts for installing the wall mount kit and assemble the wall mount kit by using screws to fix the backplane.



2.6.2 VESA Mount

The mounting for MPC175-873 Series is VESA-Arm as below:

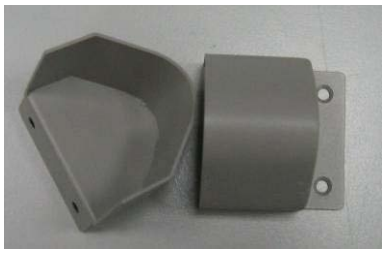
Assemble VESA-Arm by using screws to fix the backplane.



2.6.3 Desktop Stand (Optional)

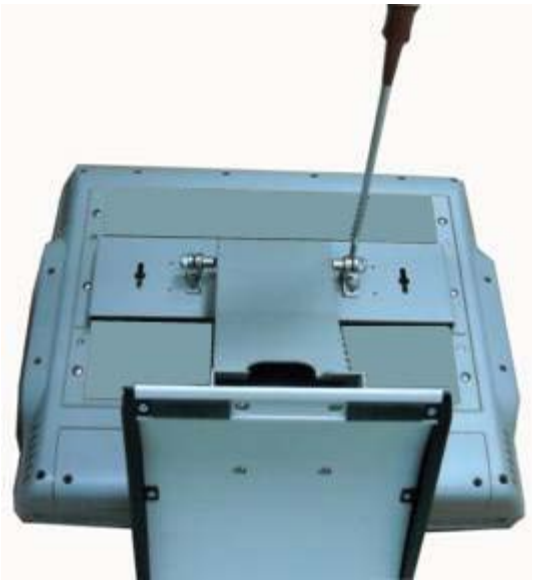
The MPC175-873 Series provides you with an optional Desktop Stand that you can follow the steps below:

Step 1 Prepare the parts of desktop stand.

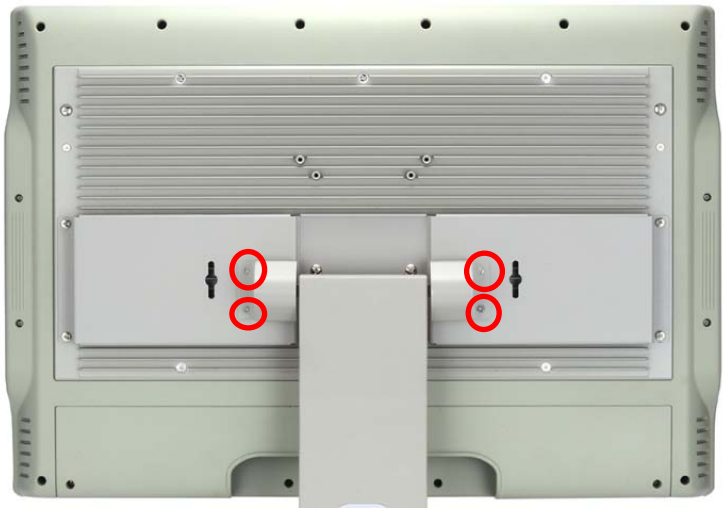
Screw A	Screw B
Screw C	**Hinge Cover**
	

Step 2 Assemble the desktop stand. Fix the screws as marked on the bottom side of chassis. (Use Screw A)

Step 3 Assemble the desktop stand by fixing it onto the system. (Use Screw B).



Step 4 Assembly the hinge cover and fix the screws as marked on the back side of chassis (Use Screw C).



Step 4 Fix the desktop stand finish.

CHAPTER 3
BIOS SETUP UTILITY

This chapter provides users with detailed description how to set up basic system configuration through the AMIBIOS8 BIOS setup utility.

3.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Delete> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.

3.2 Navigation Keys

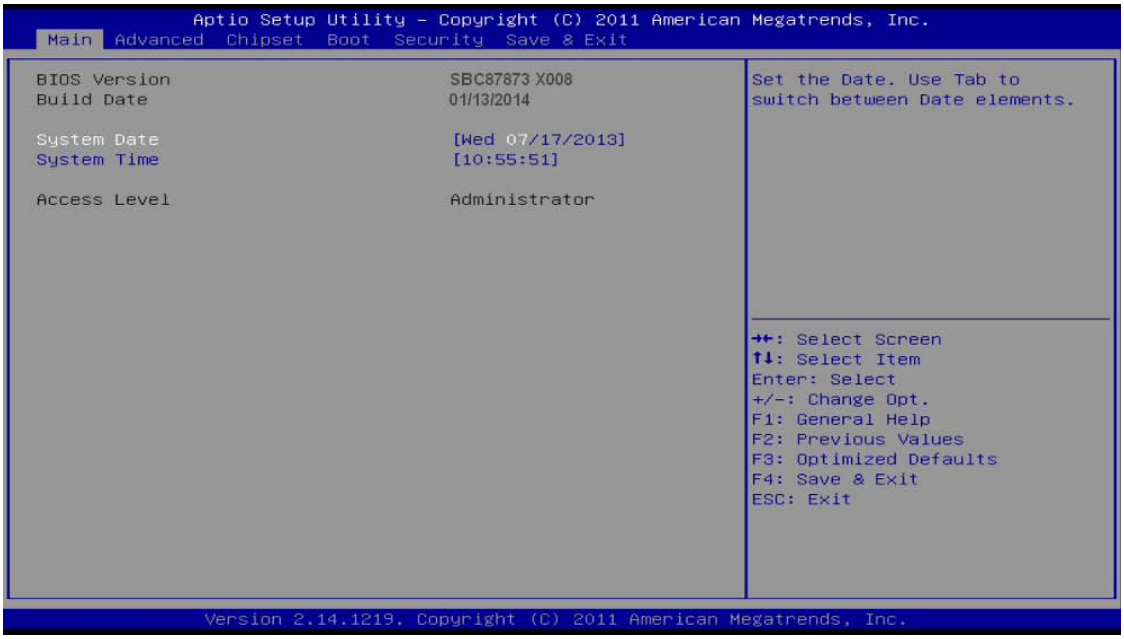
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <F3>, <F4>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note ***Some of navigation keys differ from one screen to another.***

← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to load previous value
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

3.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



System Time/Date

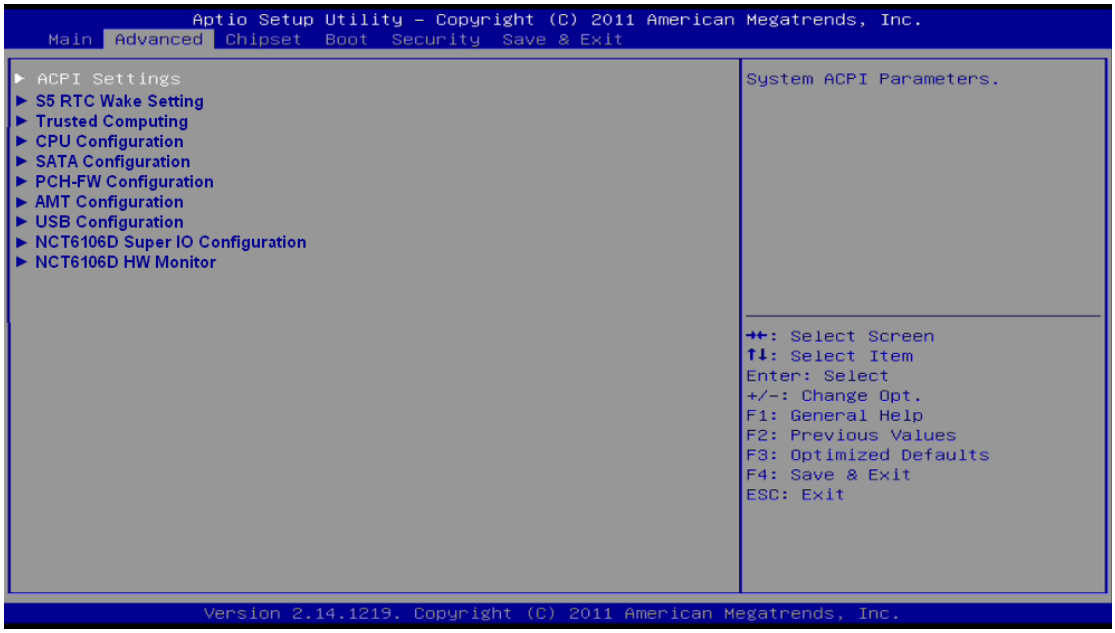
Use this option to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

3.4 Advanced Menu

The Advanced menu allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

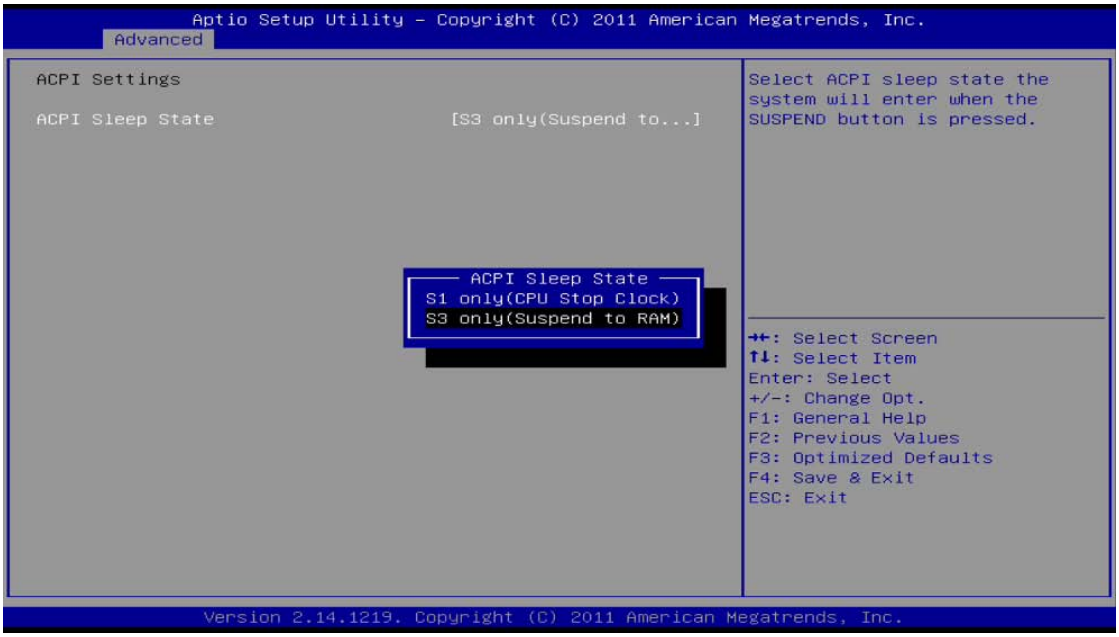
- ACPI Settings
- S5 RTC Wake Settings
- CPU Configuration
- SATA Configuration
- PCH-FW Configuration
- USB Configuration
- NCT6106D Super IO Configuration
- NCT6106D H/W Monitor

For items marked with "►", please press <Enter> for more options.



- **ACPI Settings**

You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

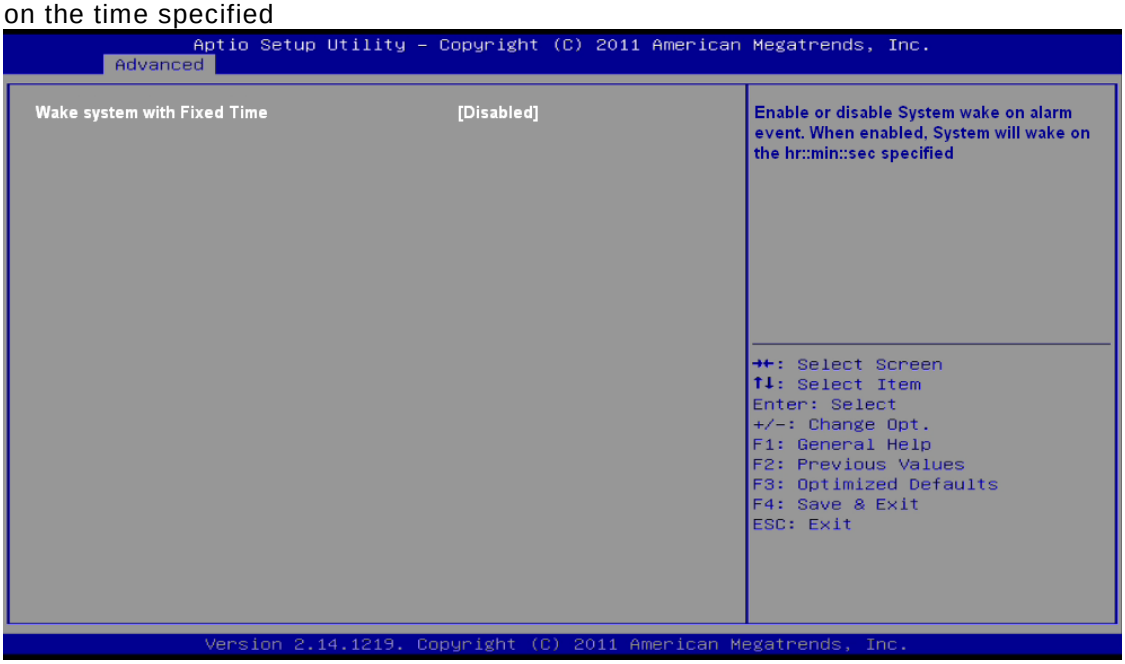

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State
[S3 only(Suspend to...]
Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
ACPI Sleep State
S1 only(CPU Stop Clock)
S3 only(Suspend to RAM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

ACPI Sleep State

Allow you to select the Advanced Configuration and Power Interface (ACPI) sleep state. Here are the options for your selection: S1 (CPU Stop Clock) and S3 (Suspend to RAM). The S3 (Suspend to RAM) option selects the highest ACPI sleep state the system will enter when SUSPEND button is pressed.

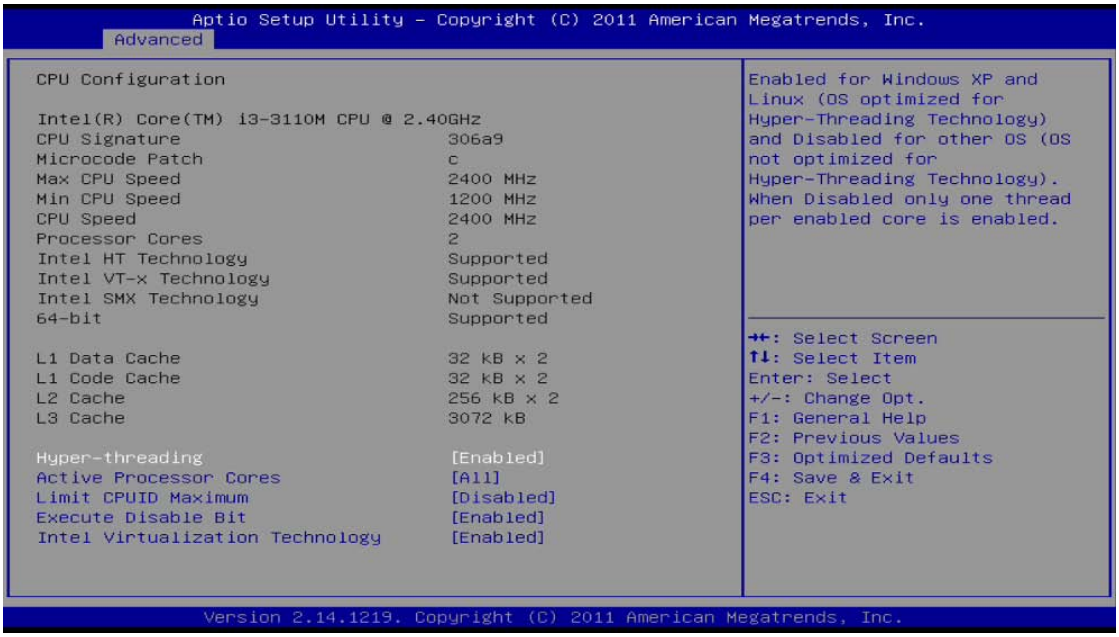
- **S5 RTC Wake Setting**

Use this option to wake on the system on the setting time. When enabled System will wake on the time specified


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Wake system with Fixed Time
[Disabled]
Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

- **CPU Configuration**

This screen shows the CPU Configuration, and you can change the value of the selected option.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
CPU Configuration
Intel(R) Core(TM) i3-3110M CPU @ 2.40GHz
CPU Signature 306a9
Microcode Patch c
Max CPU Speed 2400 MHz
Min CPU Speed 1200 MHz
CPU Speed 2400 MHz
Processor Cores 2
Intel HT Technology Supported
Intel VT-x Technology Supported
Intel SMX Technology Not Supported
64-bit Supported
L1 Data Cache 32 kB x 2
L1 Code Cache 32 kB x 2
L2 Cache 256 kB x 2
L3 Cache 3072 kB
Hyper-threading [Enabled]
Active Processor Cores [All]
Limit CPUID Maximum [Disabled]
Execute Disable Bit [Enabled]
Intel Virtualization Technology [Enabled]
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Hyper-threading

Enabled for Windows XP and Linux and disabled for other OS which do not optimized for Hyper-threating technology.

Active Processor Cores

Number of cores to enable in each processor package.

Limit CPUID Maximum

Set limit CPUID Maximum value. Should be set as "disabled" for Windows XP.

Execute Disable Bit

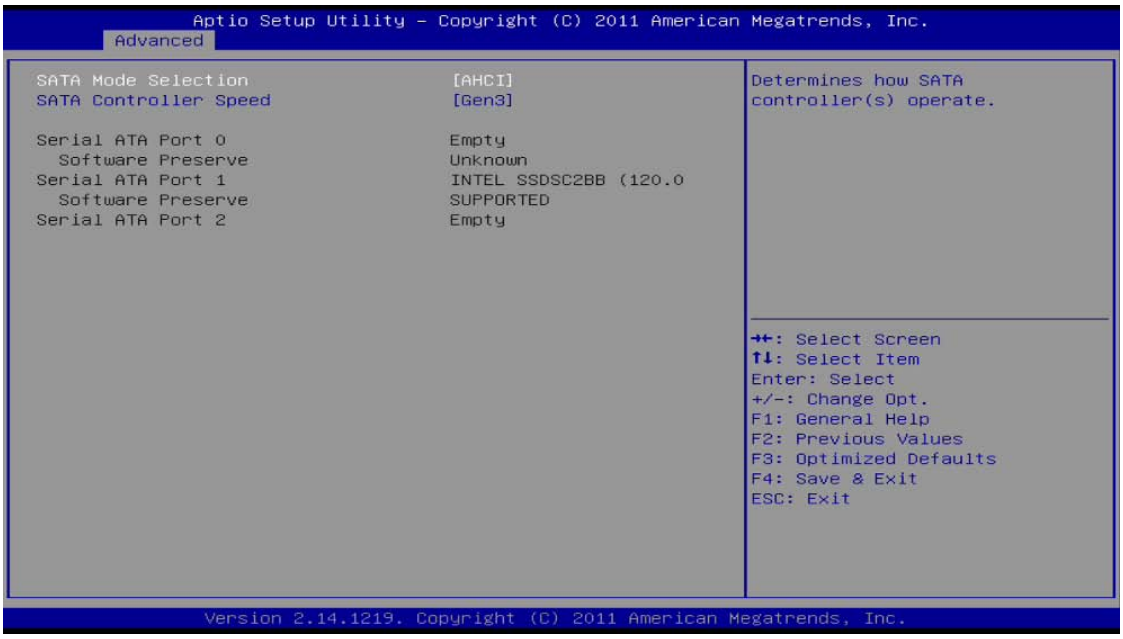
No-Execution page protection technology is able to force the XD feature flag to always return 0.

Intel Virtualization Technology

Allow you to enable or disable Intel Virtualization Technology. When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology .

- **SATA Configuration**

In the SATA Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
SATA Mode Selection [AHCI]
SATA Controller Speed [Gen3]
Serial ATA Port 0 Empty
Software Preserve Unknown
Serial ATA Port 1 INTEL SSDSC2BB (120.0
Software Preserve SUPPORTED
Serial ATA Port 2 Empty
Determines how SATA controller(s) operate.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

SATA Mode Selection

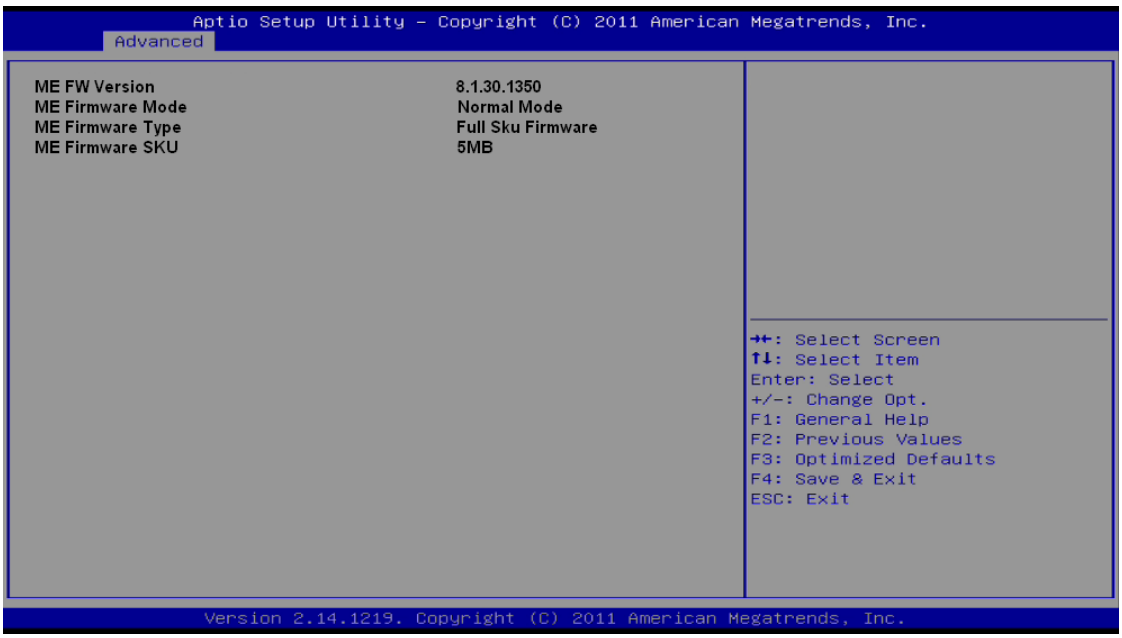
Use this item to choose the SATA operation mode. Here are the options for your selection: IDE Mode and AHCI Mode.

SATA Controller Speed

Use this item to choose the SATA speed. Here are the options for your selection: Gen1, Gen2, Gen3

- **PCH-FW Configuration**

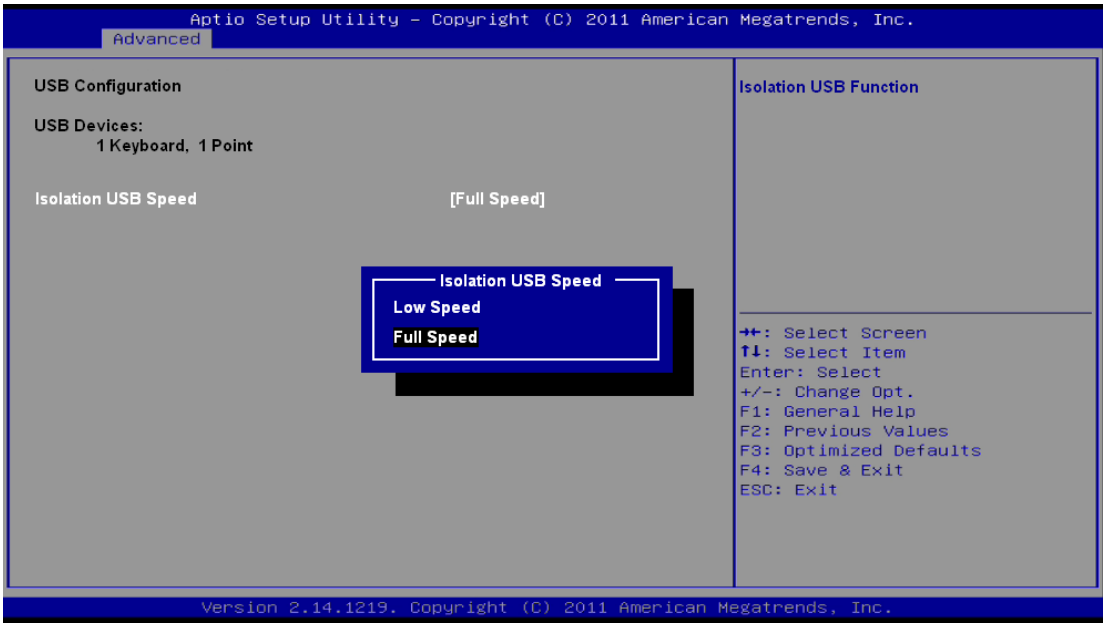
You can use this screen to confirm ME Firmware version.



- **USB Configuration**

You can use this screen to select options for the Isolation USB Configuration, and change the value of the selected option.

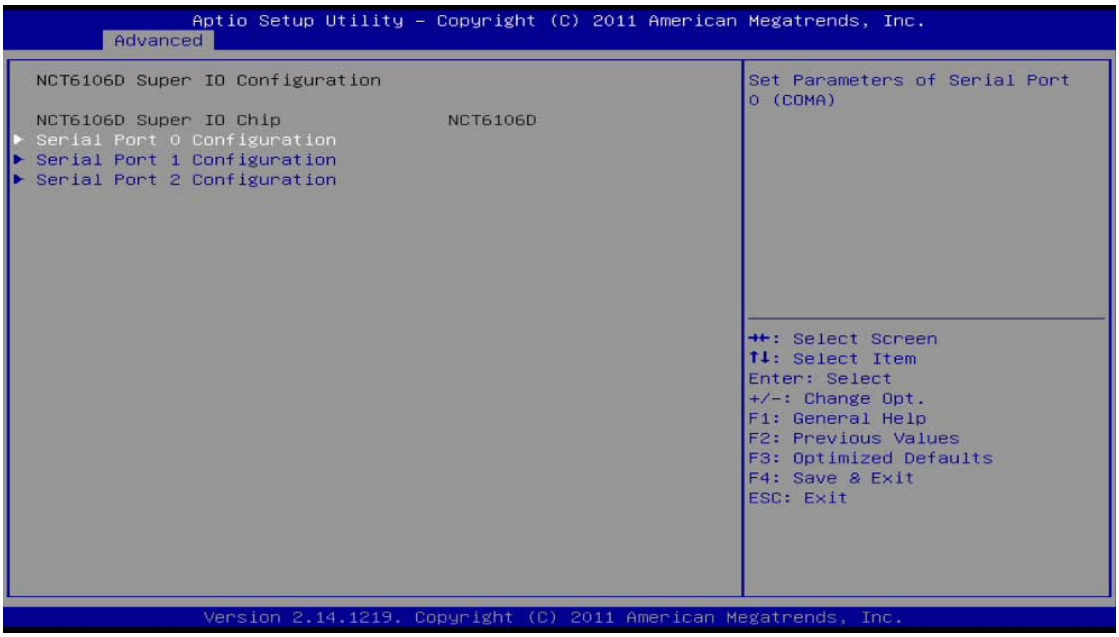
Isolation USB ports can support two kind of speed: Low Speed / Full Speed. Depending on your speed of USB device, user must select relative USB speed. Otherwise, the USB device may not work properly. Please remove the USB devices and reboot if you want to change the speed of USB.



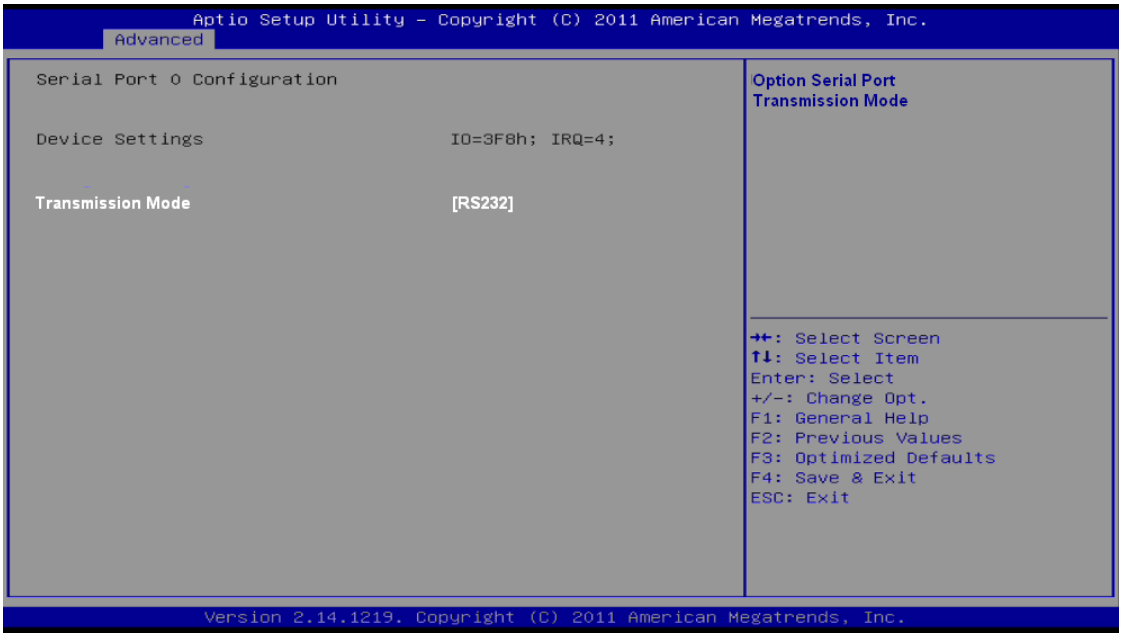
Note ***If the USB device is high speed, please make sure it can support full or low speed, and select relative speed in BIOS when user would like to connect it to isolated USB port.***

- **NCT6106D Super IO Configuration**

You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
NCT6106D Super IO Configuration
NCT6106D Super IO Chip NCT6106D
Serial Port 0 Configuration
Serial Port 1 Configuration
Serial Port 2 Configuration
Set Parameters of Serial Port 0 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

- **Serial Port 0 Configuration**



Serial Port

Use this item to enable or disable serial port 0. The optimal setting for base I/O address is 3F8h and for interrupt request line is IRQ4.

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

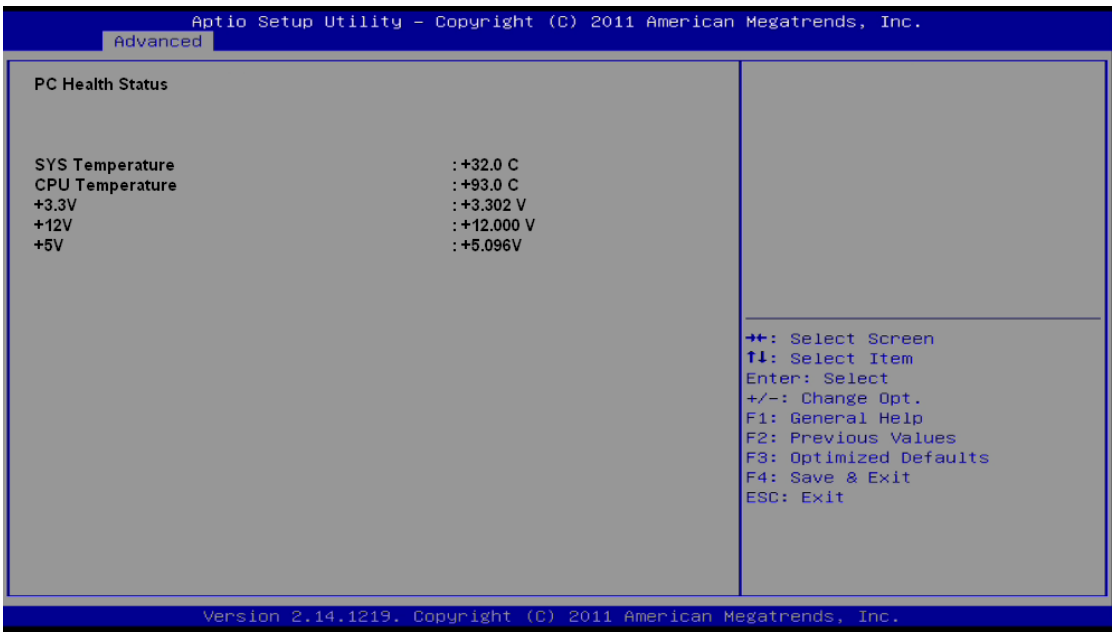
RS232

RS422

RS485

- **NCT6106D HW Monitor**

This screen shows the Hardware Health Configuration.

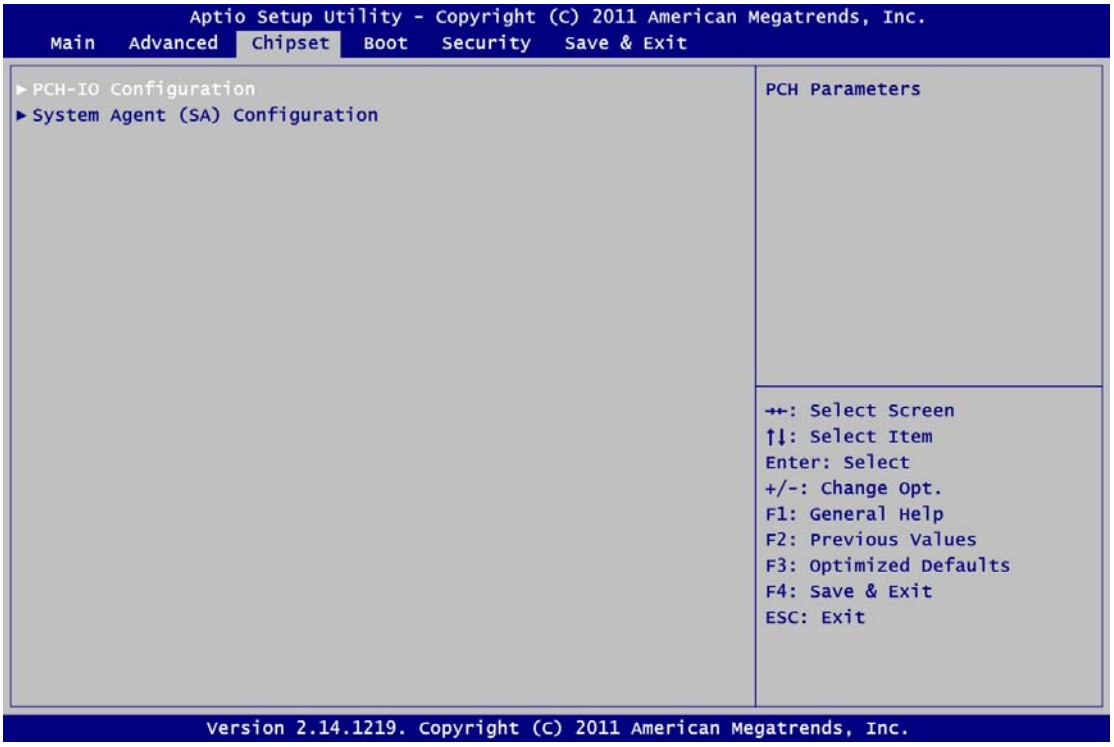


3.5 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

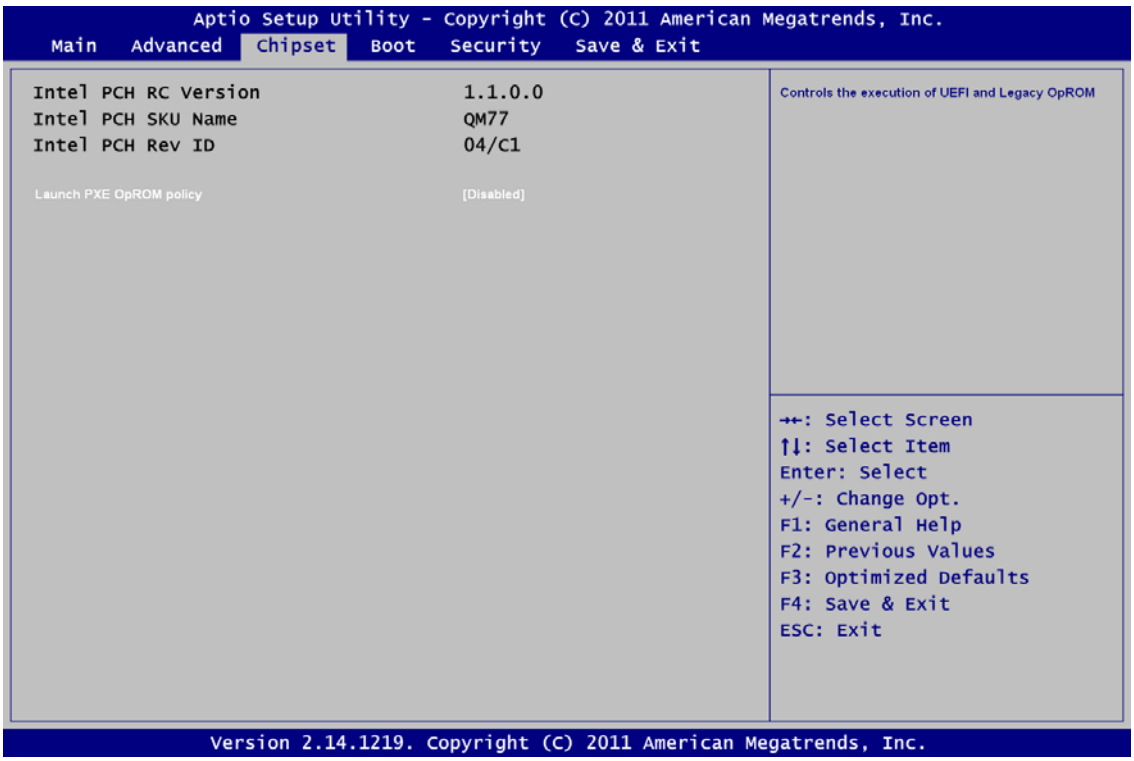
- ► PCH-IO Configuration
- ► System Agent (SA) Configuration

For items marked with "►", please press <Enter> for more options.



- **PCH-IO Configuration**

This screen allows users to set PCH parameters.

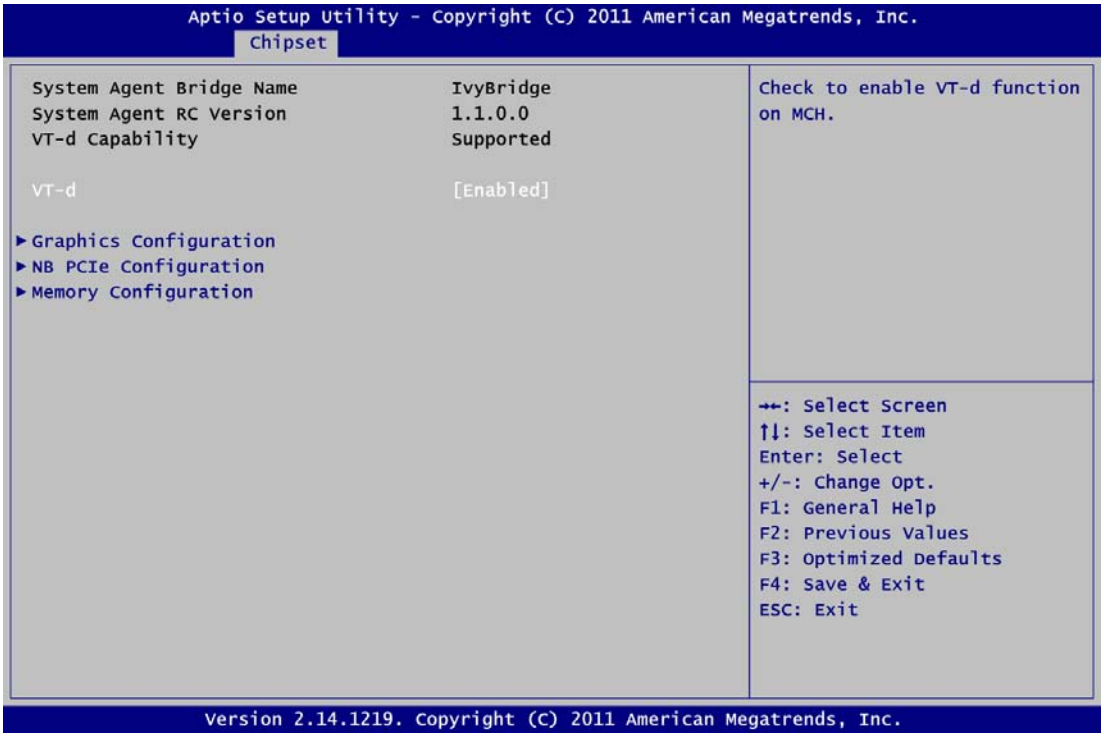


Lanuch PXE OpROM policy

Controls the execution of UEFI and Legacy OpROM

- **System Agent (SA) Configuration**

This screen shows System Agent information and provides function for specifying related parameters. For items marked with "►", please press <Enter> for more options.

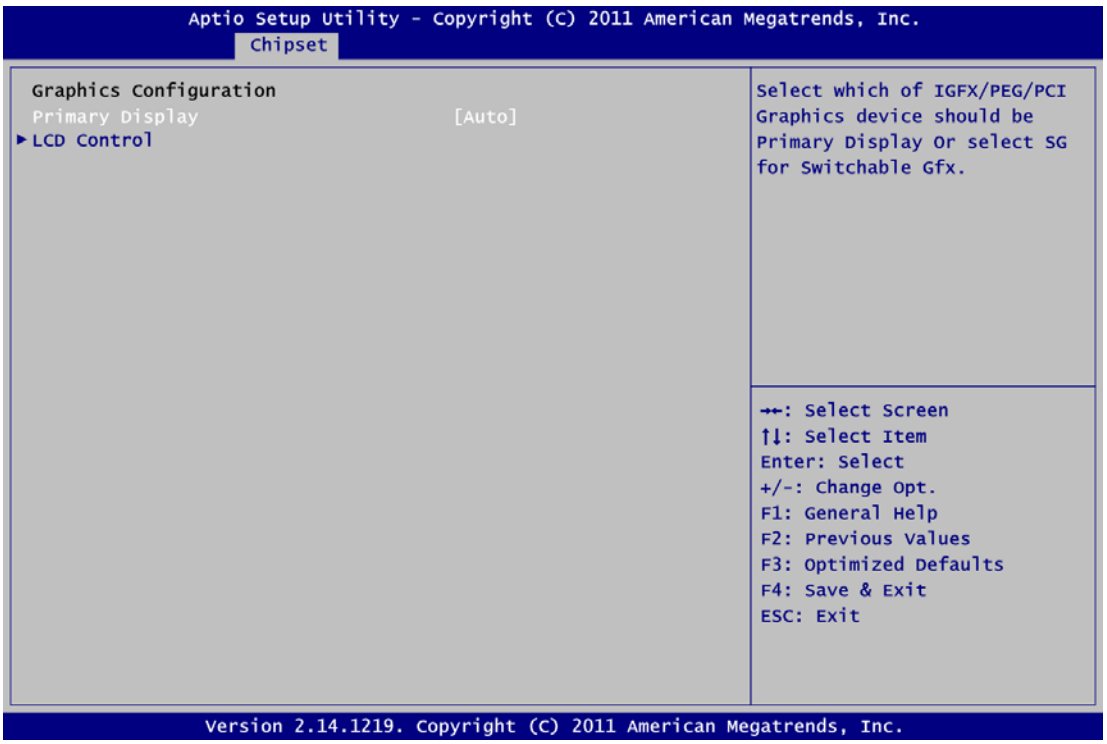


VT-d

Enable or disable Intel® chipset virtualization technology for directed I/O. VT-d can help end users improve security and reliability of the systems and also improve performance of I/O devices in virtualized environment.

- **Graphics Configuration**

This option allows users to change the integrated graphic device settings.

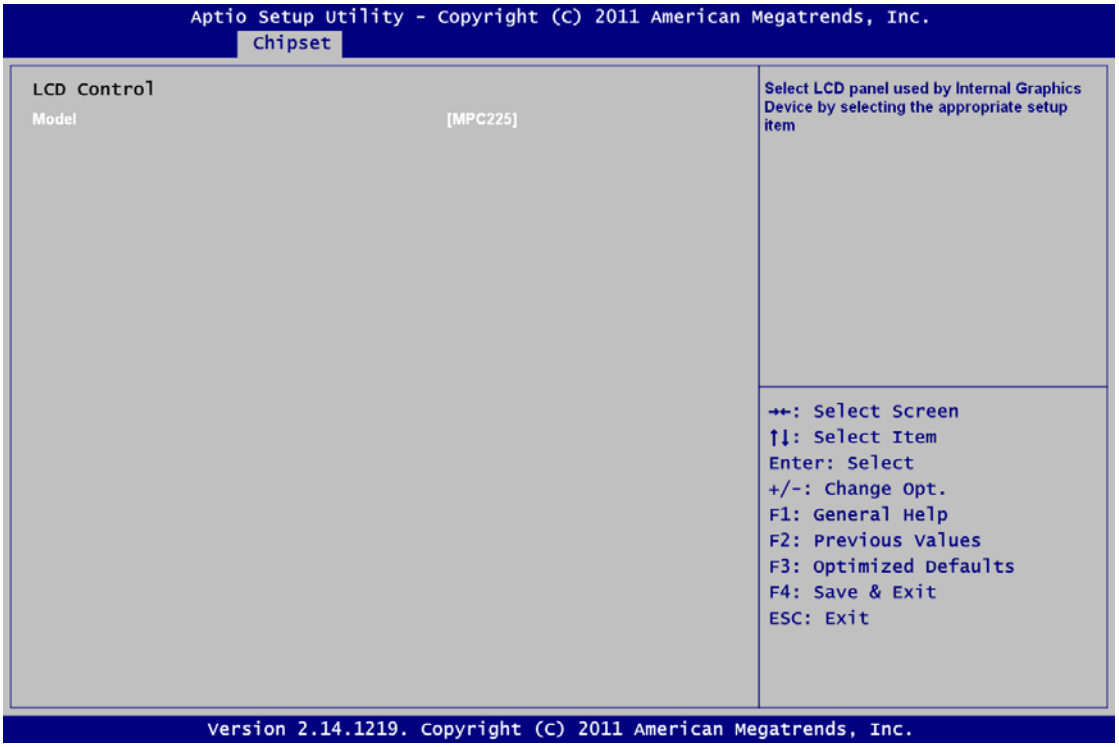

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Chipset
Graphics Configuration
Primary Display [Auto]
LCD Control
Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Primary Display

Allow you to select which graphics controller to use as the primary boot device.

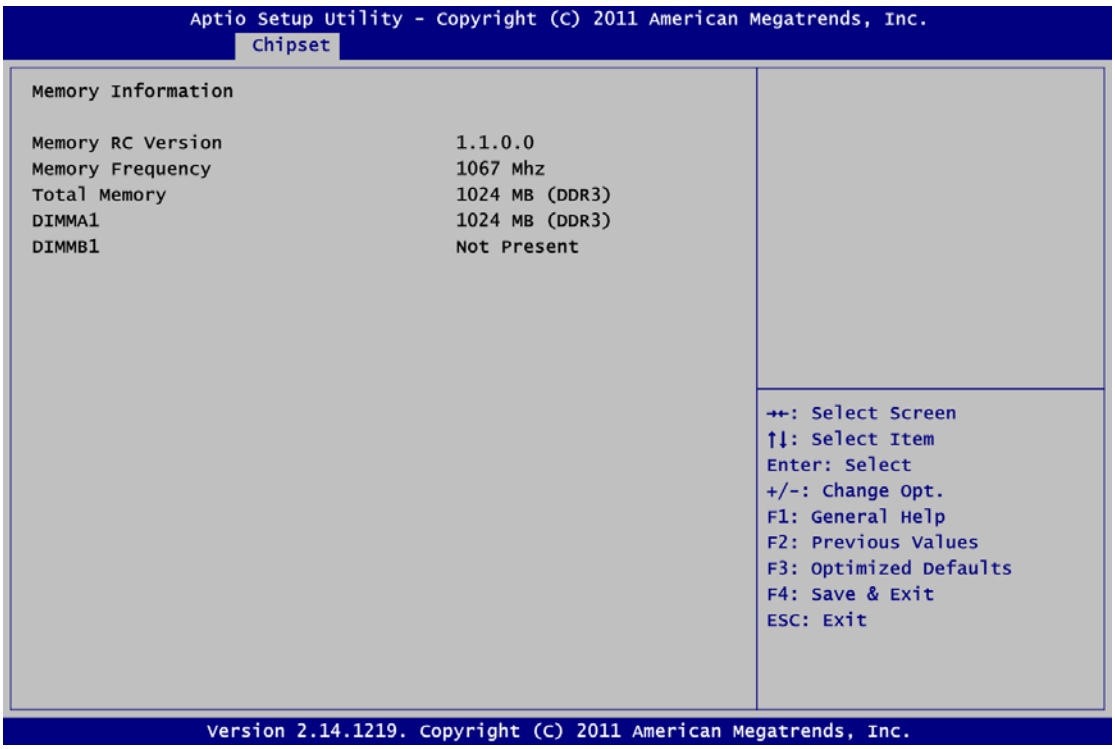
- **LCD Control**

Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.



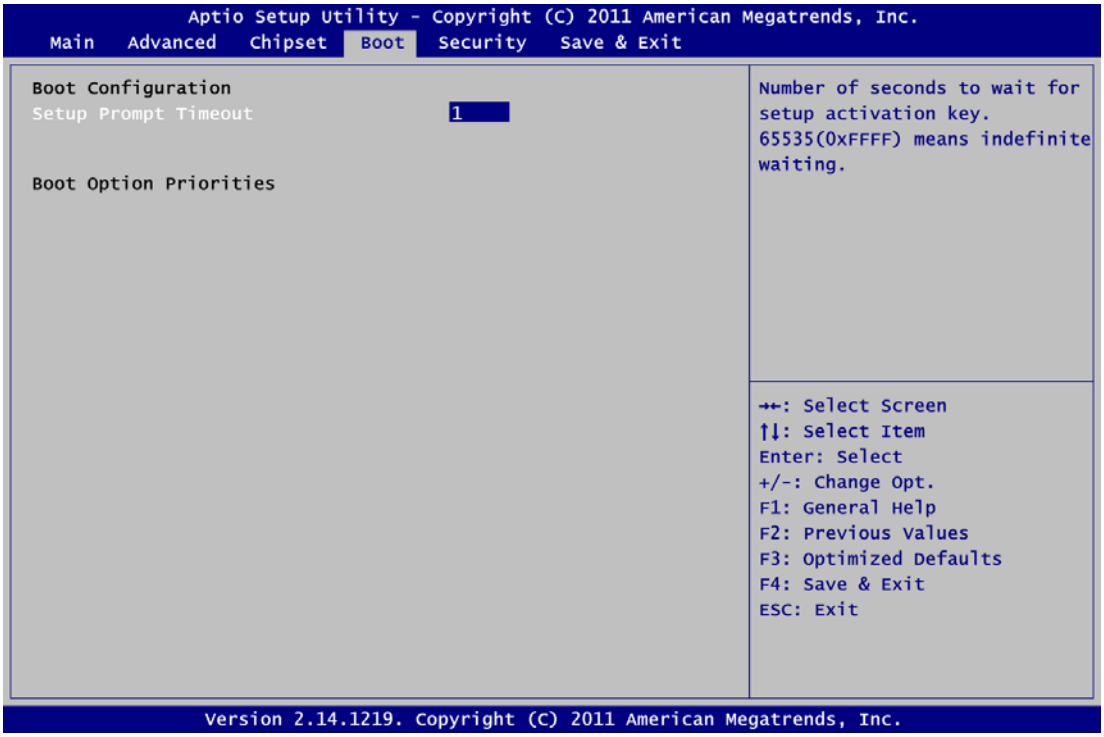
- **Memory Configuration**

This screen displays system memory information.



3.6 Boot Menu

The Boot menu allows users to change boot options of the system.


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout
1
Boot Option Priorities
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Setup Prompt Timeout

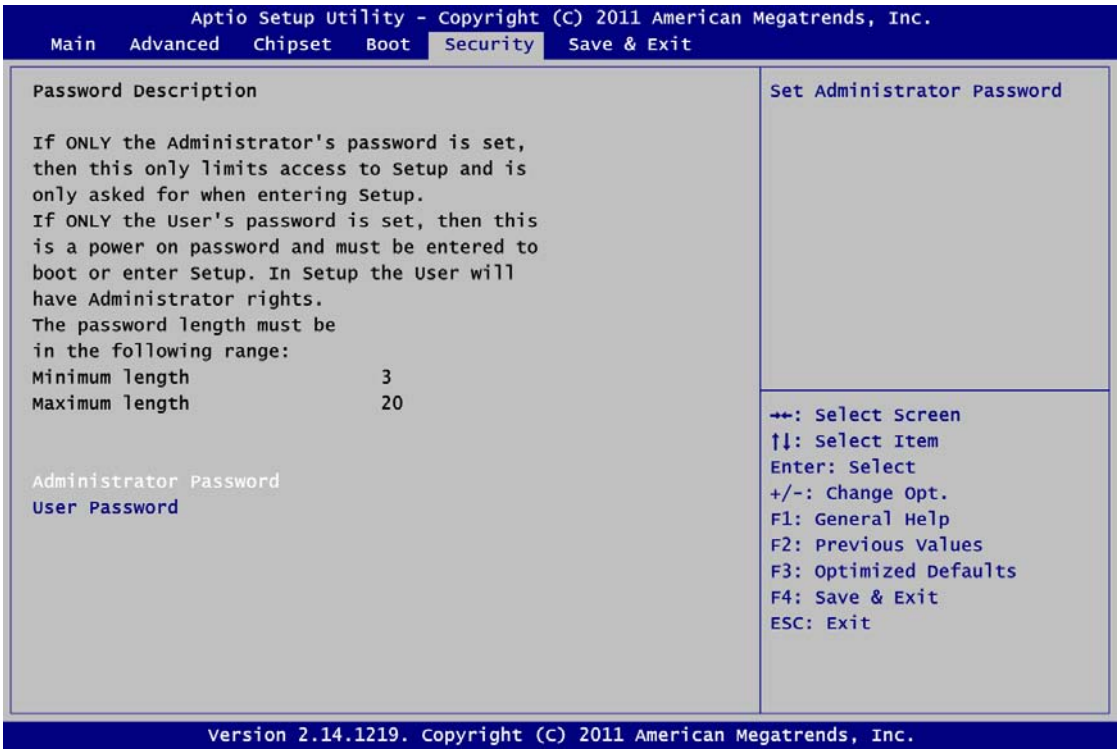
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Boot Option Priorities

These are settings for boot priority. Specify the boot device priority sequence from the available devices.

3.7 Security Menu

The Security menu allows users to change the security settings for the system.


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Administrator Password

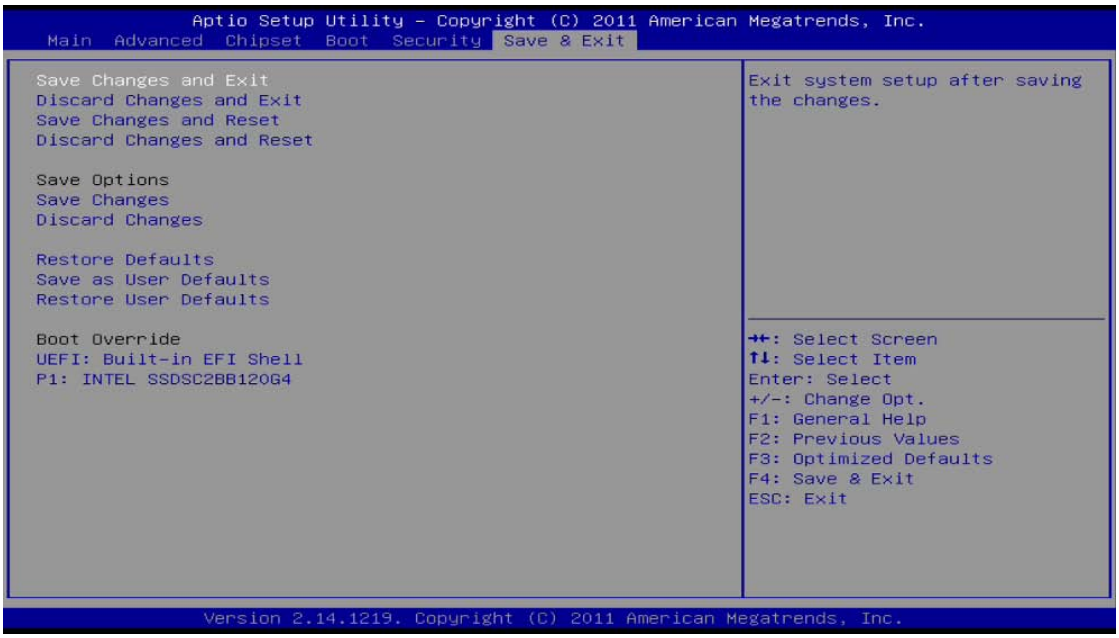
This item indicates whether an administrator password has been set (installed or uninstalled).

User Password

This item indicates whether an user password has been set (installed or uninstalled).

3.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

Save Changes and Reset

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

Save Changes

When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

Discard Changes

Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

Restore Defaults

It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

Save as User Defaults

Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

Restore User Defaults

It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

Boot Override

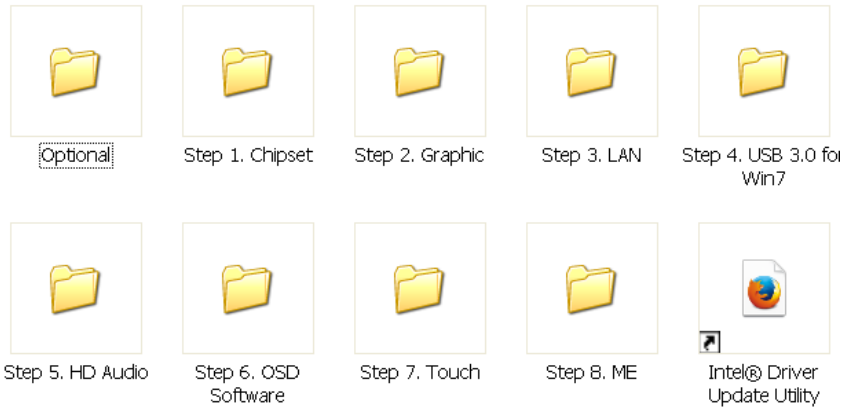
Select a drive to immediately boot that device regardless of the current boot order.

CHAPTER 4
DRIVER INSTALLATION

4.1 System

MPC175-873 supports Windows XP/ Windows 7/8 to facilitate the installation of system driver, please carefully read the instructions in this chapter before start installing.

1. Insert Driver Disc in the disk, and select the \MPC175-873\Driver\..



2. Please follow folder Step 1 to Step 8 for MPC175-873 driver installation.

4.2 Touch Screen

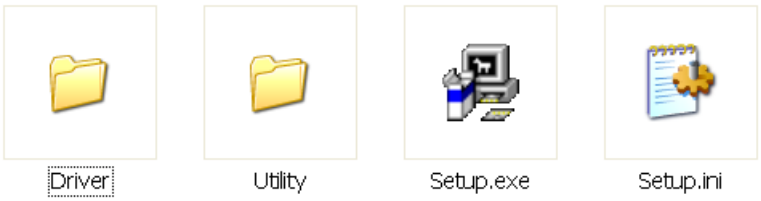
4.2.1 Specification

Touch Screen	For 5-wire analog resistive type
Touch Screen Controller	PenMount 6000 microcontroller
Communications	USB
Resolution	1024 x 1024
Power Input	5V
Power Consumption	Standby Mode : 13.4mA; Active Mode: 24.6mA (VCC=5V, Top sheet Panel Resistance: 274 ohm, Bottom sheet Panel Resistance: 770 ohm)

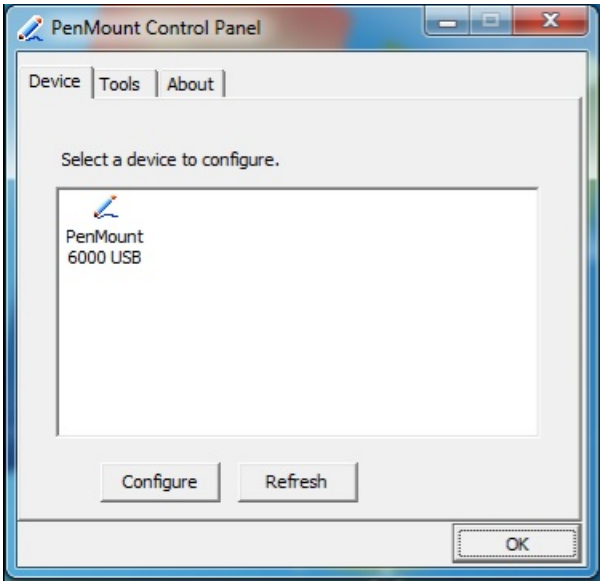
4.2.2 Driver Installation

The **MPC175-873 Series** provides a driver of the touch screen that users can install it under operating system Windows XP/7/8. To facilitate this touch screen driver installation, users should read the instructions in this chapter carefully before start the installation.

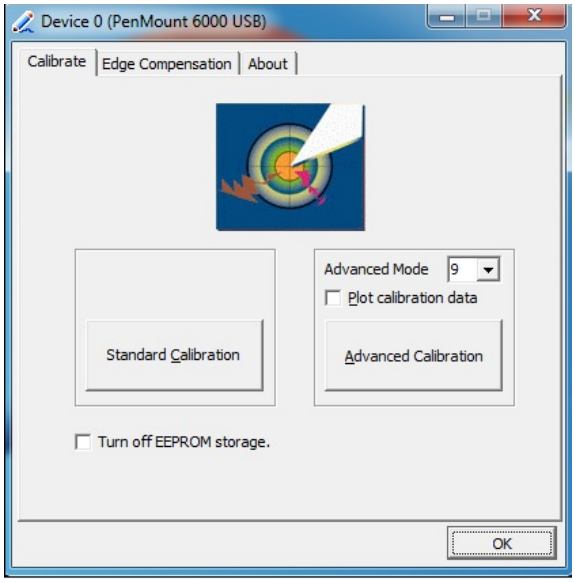
1. Insert Driver CD and select the D:\MPC175-873\Driver\Step7 - Touch



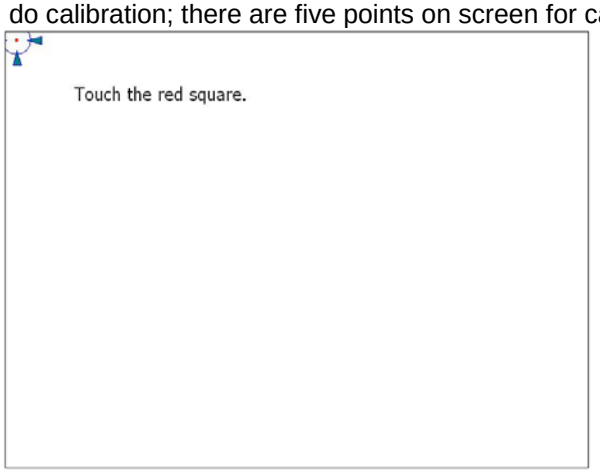
2. Follow the installing procedure and press OK.
3. Click Start menu and select "PenMount Control Panel", and then double click PenMount 6000 USB.



4. Click the "Standard Calibration" button.



5. Calibration:
   To adjust the display with touch panel, click "Calibration" and follow the calibrate point to do calibration; there are five points on screen for calibration.



6. Press OK.

4.3 OSD sync service install/uninstall

This OSD sync service can let front OSD key synchronize brightness and volume adjustment with Windows OS and also show OSD notification bar on the screen.

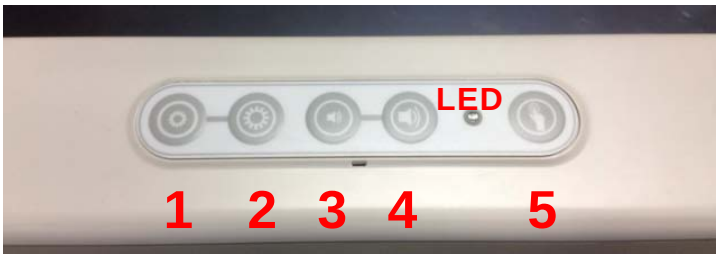
1. Insert Driver CD and select the D:\MPC175-873\Driver\Step7 - Touch

2. For 64bit OS, run Setup_x64.msi. For 32bit OS, run Setup_x86.msi.

3. Follow the installing procedure and press OK.

Note ***In Windows XP and Windows 8, it requires .NET Framework 3.5 to install OSD Sync Service. User needs to connect to Internet to get .NET Framework 3.5 from Microsoft. If user doesn't install this service, the brightness front OSD keys still can work. But it cannot synchronize with OS and cannot show OSD notification bar on the screen. The volume front OSD keys don't work without OSD sync service***

4.4 Front OSD function keys



Key	MPC Function
Key 1	Brightness-
Key 2	Brightness+
Key 3	Volume-
Key 4	Volume+
Key 5	Touch enable/disable
Key 1+2 (Press 2 second)	Power on/off
Key 3+4	Mute enable/disable

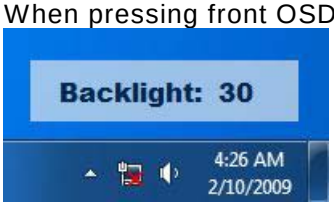
Key 1, 2, 3, 4 will be triggered repeatedly after long pressing one seconed.

4.5 LED indicator status

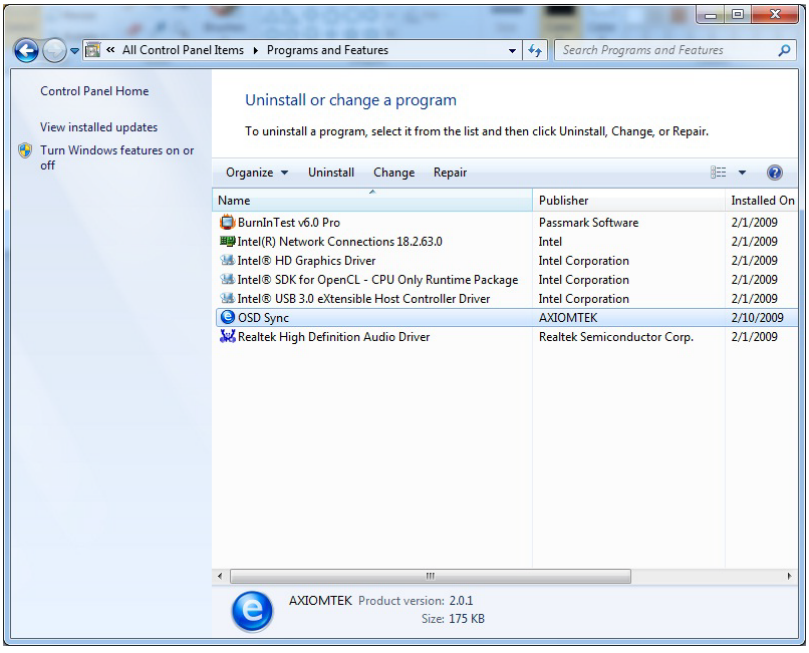
- Power on(S0): Green
- Power off(S5): Black
- LCD off: Orange
- Touch off: Orange flash

OSD & notification bar & setup information

When pressing front OSD key, OS will show OSD notification status as following.

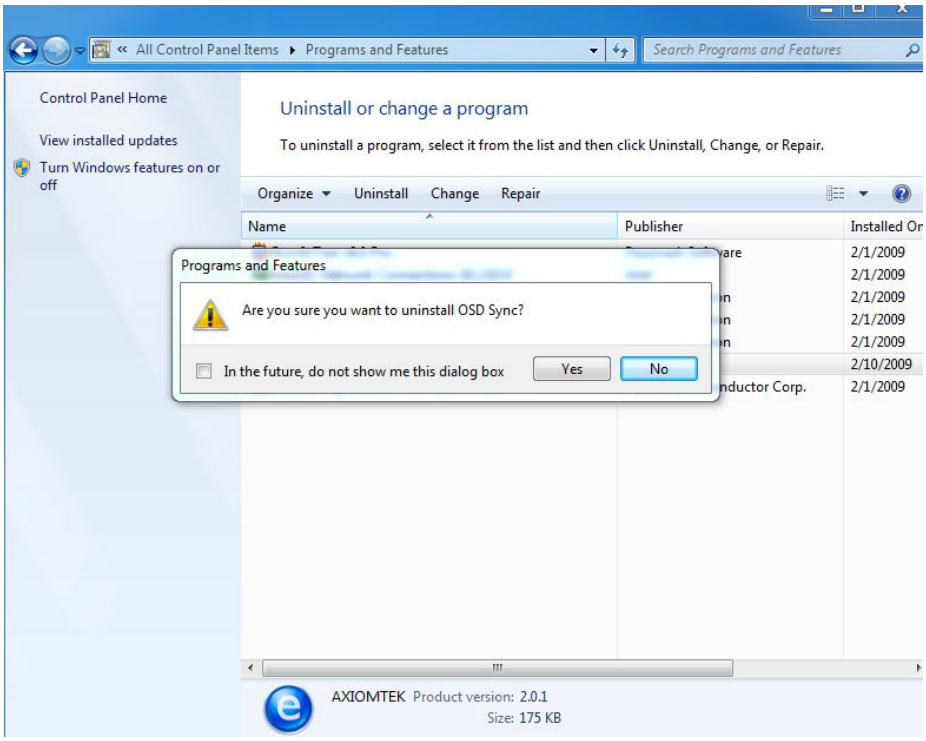


User can find service as following.

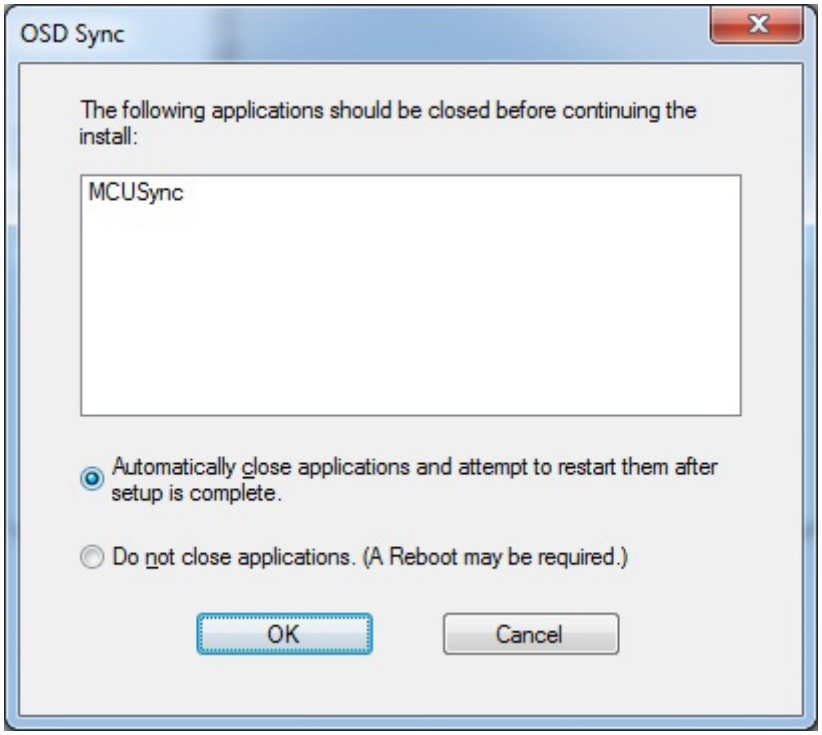


4.6 Uninstall this service

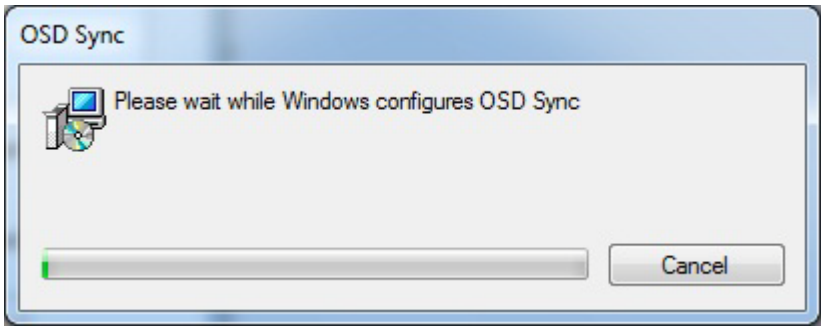
1. double click OSD Sync from programs and features of control panel


All Control Panel Items ▸ Programs and Features
Search Programs and Features
Control Panel Home
View installed updates
Turn Windows features on or off
Uninstall or change a program
To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.
Organize
Uninstall
Change
Repair
Name
Publisher
Installed On
Programs and Features
Are you sure you want to uninstall OSD Sync?
In the future, do not show me this dialog box
Yes
No
AXIOMTEK Product version: 2.0.1
Size: 175 KB

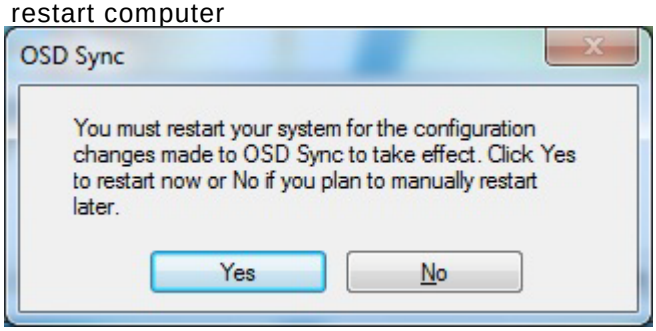
2. Choose "Automatically close applications" and click ok


OSD Sync
The following applications should be closed before continuing the install:
MCUSync
Automatically close applications and attempt to restart them after setup is complete.
Do not close applications. (A Reboot may be required.)
OK
Cancel

3. uninstalling



4. restart computer


OSD Sync
You must restart your system for the configuration changes made to OSD Sync to take effect. Click Yes to restart now or No if you plan to manually restart later.
Yes
No

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Appendix A
Watchdog Timer

About Watchdog Timer

Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

How to Use the Watchdog Timer
(Following is example to enable configuration by using debug tool)

Enable WDT

1.Enable SIO configuration
-O 2E 87
-O 2E 87
2. Select Logic device:
-O 2E 07
-O 2F 08
3. WDT Device Enable
-O 2E 30
-O 2F 01

5. Set timer unit
-O 2E F0
-O 2F 00 → (00: Sec; 08: Minute)
4. Set base timer:
-O 2E F1
-O 2F 0A →Set Reset Time (Ex.0A:10 Sec)

Disable WDT

1.Enable configuration
-O 2E 87
-O 2E 87
2. Select Logic device:
-O 2E 07
-O 2F 08
3. WDT Device Disable
-O 2E 30
-O 2F 00

Digital I/O Software Programming
(Following is example to enable configuration by using debug tool)

1.Enable SIO configuration
-O 2E 87
-O 2E 87

2. Select Logic device:
-O 2E 07
-O 2F 07

3. GPIO2 Enable
-O 2E 30
-O 2F DC
-O 2E 1C
-O 2F 1D

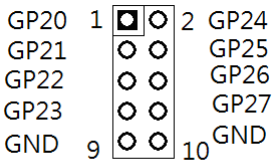
4. Set IO register (set GP20-23: input, GP24-27: output)
-O 2E E8
-O 2F 0F ➔ (1: input port, 0: output port)

5. Data register
-O 2E E9
-O 2F 00 ➔ GP24-27 output ports = low
GP20-23 input ports is read only
- I 2F ➔ GP20-23 input ports read (default is high)

Note

GP20 =Bit0
GP21 =Bit1
GP22 =Bit2
GP23 =Bit3
GP24 =Bit4
GP25 =Bit5
GP26 =Bit6
GP27 =Bit7

Pin Assignment



Appendix B
Intel iAMT Settings

The Intel® Active Management Technology (Intel® iAMT) has decreased a major barrier to IT efficiency that uses built-in platform capabilities and popular third-party management and security applications to allow IT a better discovering, healing, and protection their networked computing assets.

In order to utilize Intel® iAMT you must enter the ME BIOS (<Ctrl + P> during system startup), change the ME BIOS password, and then select "Intel® iAMT" as the manageability feature.

Entering MEBx

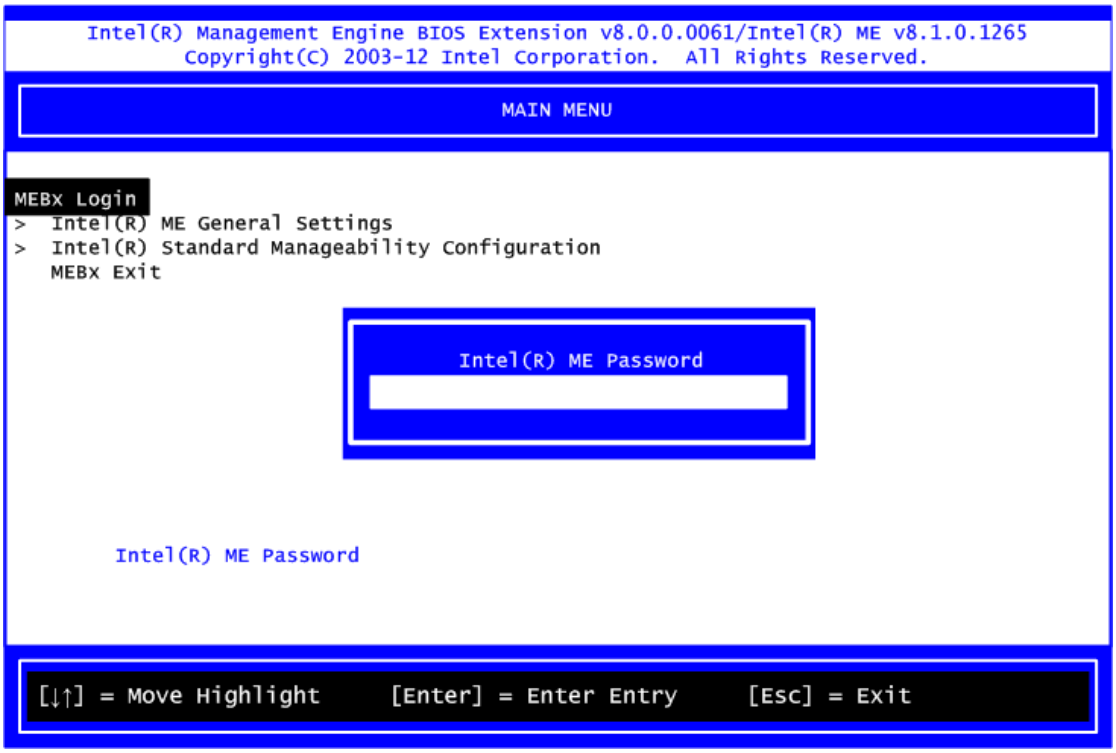
1. You must go to BIOS to enable Intel® iAMT function.
2. Exit from BIOS after starting Intel® iAMT, and press <Ctrl + P> to enter MEBx Setting.

Note: ***It is better to press <Ctrl + P> before the screen popping out.***

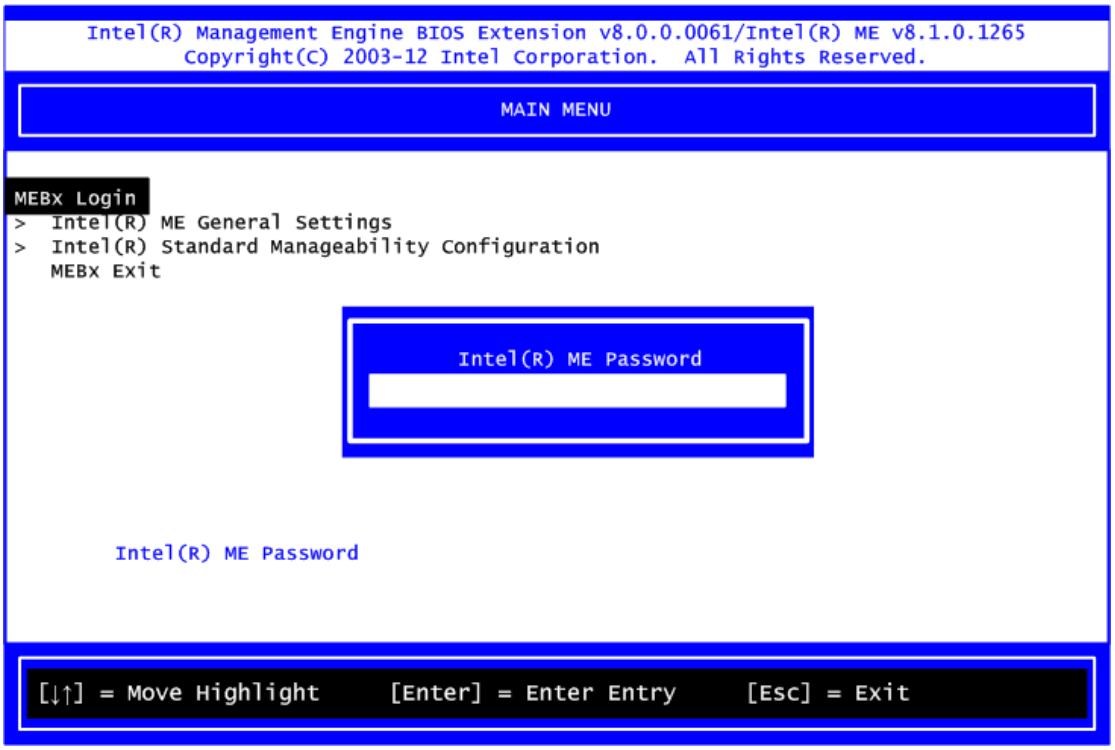
American Megatrends
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
BIOS Date: 02/10/2012 16:40:56 Ver: 1APTC
Press <CTRL + P> to Enter MEBX setup menu
Press <DEL> or <F2> to enter setup.

Set and Change Password

1. You will be asked to set a password when first log in. The default password is "admin".


Intel(R) Management Engine BIOS Extension v8.0.0.0061/Intel(R) ME v8.1.0.1265
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
MAIN MENU
MEBx Login
> Intel(R) ME General Settings
> Intel(R) Standard Manageability Configuration
MEBx Exit
Intel(R) ME Password
Intel(R) ME Password
[↓↑] = Move Highlight
[Enter] = Enter Entry
[Esc] = Exit

2. You will be asked to change the password before setting ME.


Intel(R) Management Engine BIOS Extension v8.0.0.0061/Intel(R) ME v8.1.0.1265
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
MAIN MENU
MEBx Login
> Intel(R) ME General Settings
> Intel(R) Standard Manageability Configuration
MEBx Exit
Intel(R) ME Password
Intel(R) ME Password
[↓↑] = Move Highlight
[Enter] = Enter Entry
[Esc] = Exit

3. You must confirm your new password while revising. The new password must contain: (example: **!!11qqQQ**) (default value).
   - Eight characters
   - One upper case
   - One lower case
   - One number
   - One special symbol, such as ! 、 $ or ; ， (、 " , excepted)

   Underline (_) and space are valid characters for password, but they won't make higher complexity.

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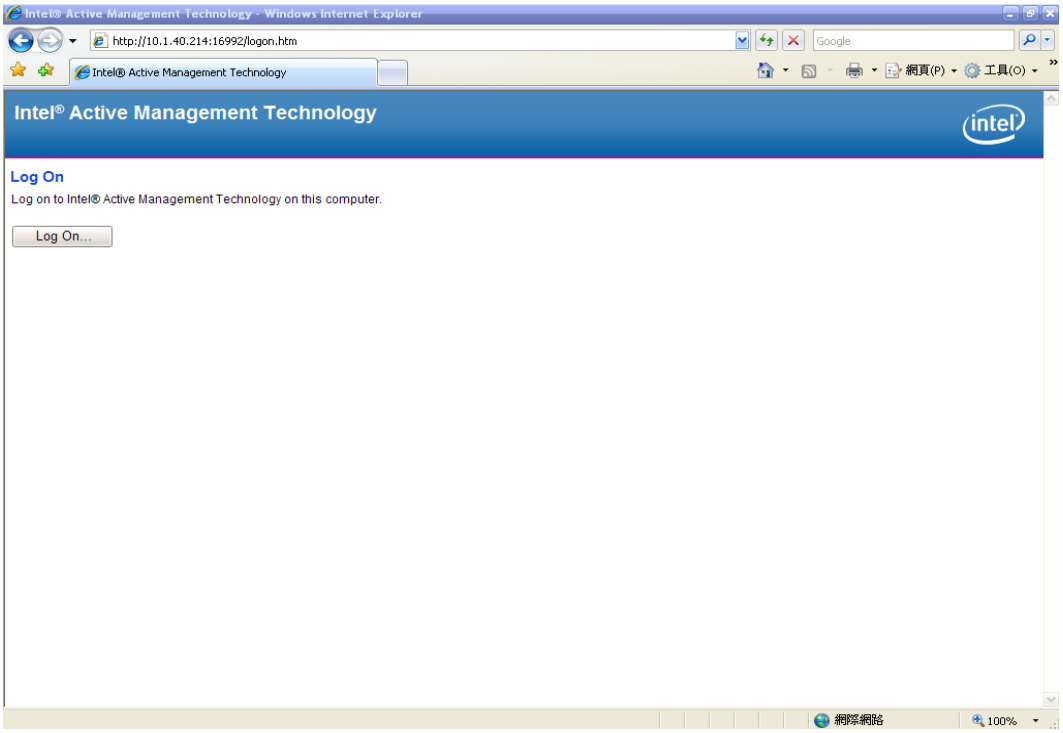
Appendix C
Intel iAMT Web Console

1. From a web browser, please type http://(IP ADDRESS):16992, which connects to Intel® iAMT Web.

   Example: http://10.1.40.214:16992

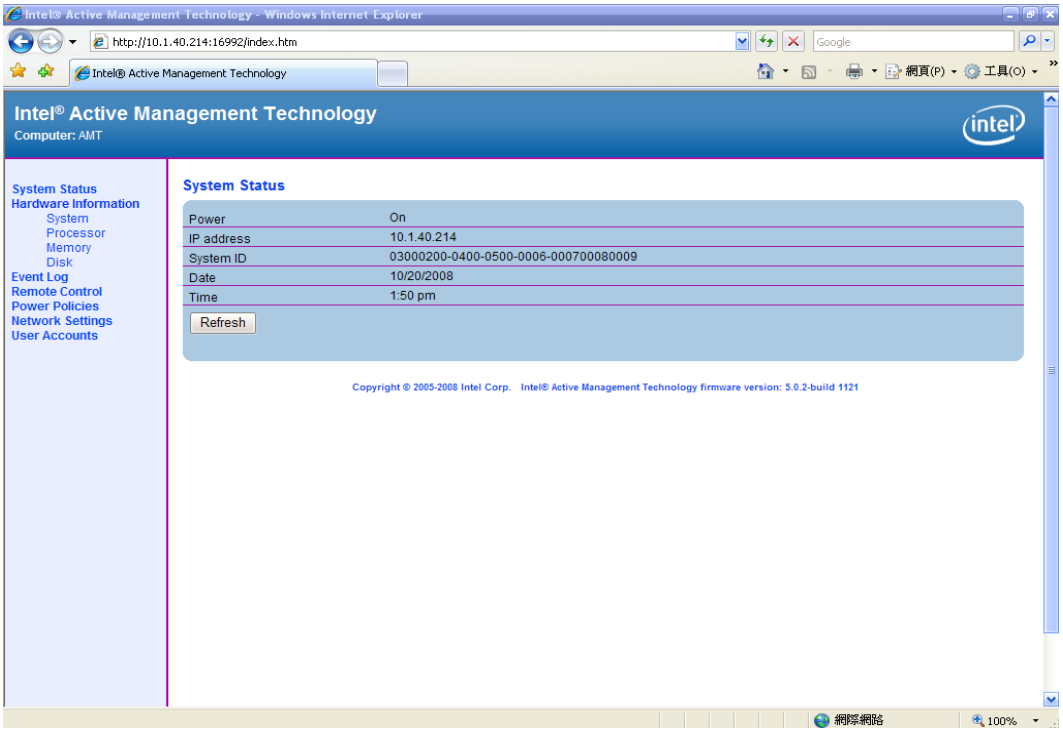

Intel® Active Management Technology - Windows Internet Explorer
http://10.1.40.214:16992/logon.htm
Intel® Active Management Technology
Intel® Active Management Technology
Log On
Log on to Intel® Active Management Technology on this computer.
Log On...
100%

2. To log on, you will be required to type in username and password for access to the Web.

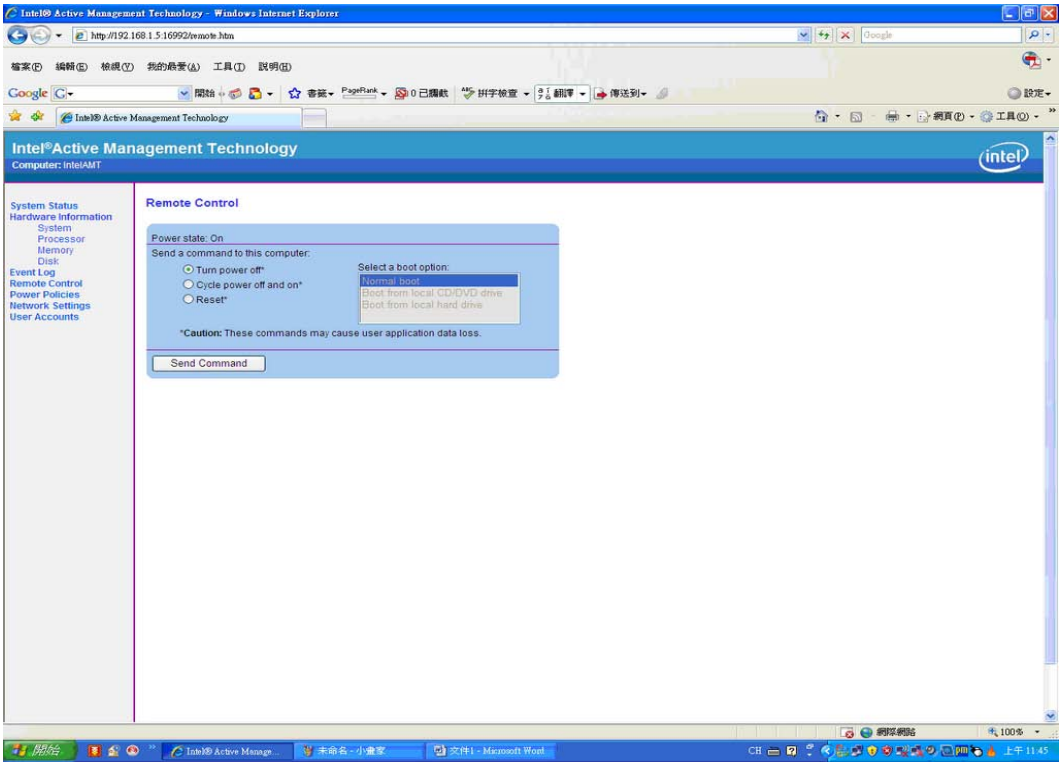
   USER: admin (default value)

   PASS: (MEBx password)

3. Enter the iAMT Web.



4. Click Remote Control, and select commands on the right side.



5. When you have finished using the iAMT Web console, close the Web browser.

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Appendix D
NOTE

This product conforms to the provisions of the EC directive 93/42/EEC (Medical Device Directive). And also complies with following standards (included but not limited):

Safety standard:
- ANSI/AAMI ES60601-1 (2005)+ A1 (2012)(Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance)
- CAN/CSA-C22.2 No. 60601-1 (2014) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) .
- EN 60601-1 Medical electrical equipment part 1: General requirements for safety

EMC standard:
EN 60601-1-2 Medical electrical equipment part 1-2: General requirements for safety- Collateral standard: Electromagnetic compatibility- Requirements and tests

Follow instructions for use.

Discard the used product to the recycling collection point according to local regulations.

Appendix E
EMC Statement

Warning:
• MEDICAL ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.

• Portable and mobile RF communications equipment can affect MEDICAL ELECTRICAL EQUIPMENT.

• The use of accessories, transducers and cables other than those specified by Alter-G Incorporated, may result in increased EMISSIONS or decreased IMMUNITY of the EQUIPMENT.

• This EQUIPMENT should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the EQUIPMENT should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration – electromagnetic emissions

The device is intended for use in the electromagnetic environments listed below, and should only be used in such environments:

Emissions test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	RF energy is used only to maintain device's operation. Therefore, its RF emissions are so low that it's not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The device is suitable for use in all establishments, including domestic establishments, and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Meet the requirement	

Guidance and manufacturer's declaration – electromagnetic immunity

The device is intended for use in the electromagnetic environments listed below, and should only be used in such environments:

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = [3.5/V1]\sqrt{P}$ $d = [3.5/E1]\sqrt{P}$ 80 MHz to 800 MHz $d = [7/E1]\sqrt{P}$ 800 MHz to 2,5 GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,a should be less than the compliance level in each frequency range.b Interference may occur in the vicinity of equipment marked with the following symbol:
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	
NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a]Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the device. [b]Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Guidance and manufacturer's declaration – electromagnetic immunity
The device is intended for use in the electromagnetic environments listed below, and should only be used in such environments:

Immunity test	**IEC 60601-1-2 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	6 kV contact 8 kV air	6 kV contact 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient (EFT) IEC 61000-4-4	±2 kV applied on AC power lines ±1 kV applied on RJ45 port	±2 kV applied on AC power port ±1 kV applied on RJ45 port	Mains power quality should be that of a typical commercial or hospital environment.
Surge Immunity Test (Surge) IEC 61000-4-5	± 1 kV line to line ± 2 kV line to earth	± 1 kV line to line	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60 Hz) magnetic field (PFMF) IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage Dip & Voltage Interruptions IEC 61000-4-11	0% U_T (100% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles 0% U_T (100% interruptions in U_T) for 5 s	0% U_T (100% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles 0% U_T (100% interruptions in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If a dips or an interruption of mains power occurs, the current of the display series may be dropped off from normal level, it may be necessary to use uninterruptible power supply or a battery.
NOTE : U_T is the AC mains voltage prior to application of the test level.			

Recommended separation distances between portable and mobile RF communication equipment and the device.

The device is intended for use in an electromagnetic environment where radiated RF disturbances are under control. User can help prevent electromagnetic interference by keeping the device at a minimum distance from portable and mobile RF communications equipment (transmitters). Below table details the maximum output power of transmitter:

Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter**		
	150 kHz to 80 MHz $d = [3.5/V1]\sqrt{P}$	**80 MHz to 800 MHz** $d = [3.5/E1]\sqrt{P}$	**800 MHz to 2,5 GHz** $d = [7/E1]\sqrt{P}$
0.01	**0.12**	**0.12**	**0.23**
0.1	**0.37**	**0.37**	**0.74**
1	**1.17**	**1.17**	**2.33**
10	**3.69**	**3.69**	**7.39**
100	**11.67**	**11.67**	**23.33**

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.
NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.